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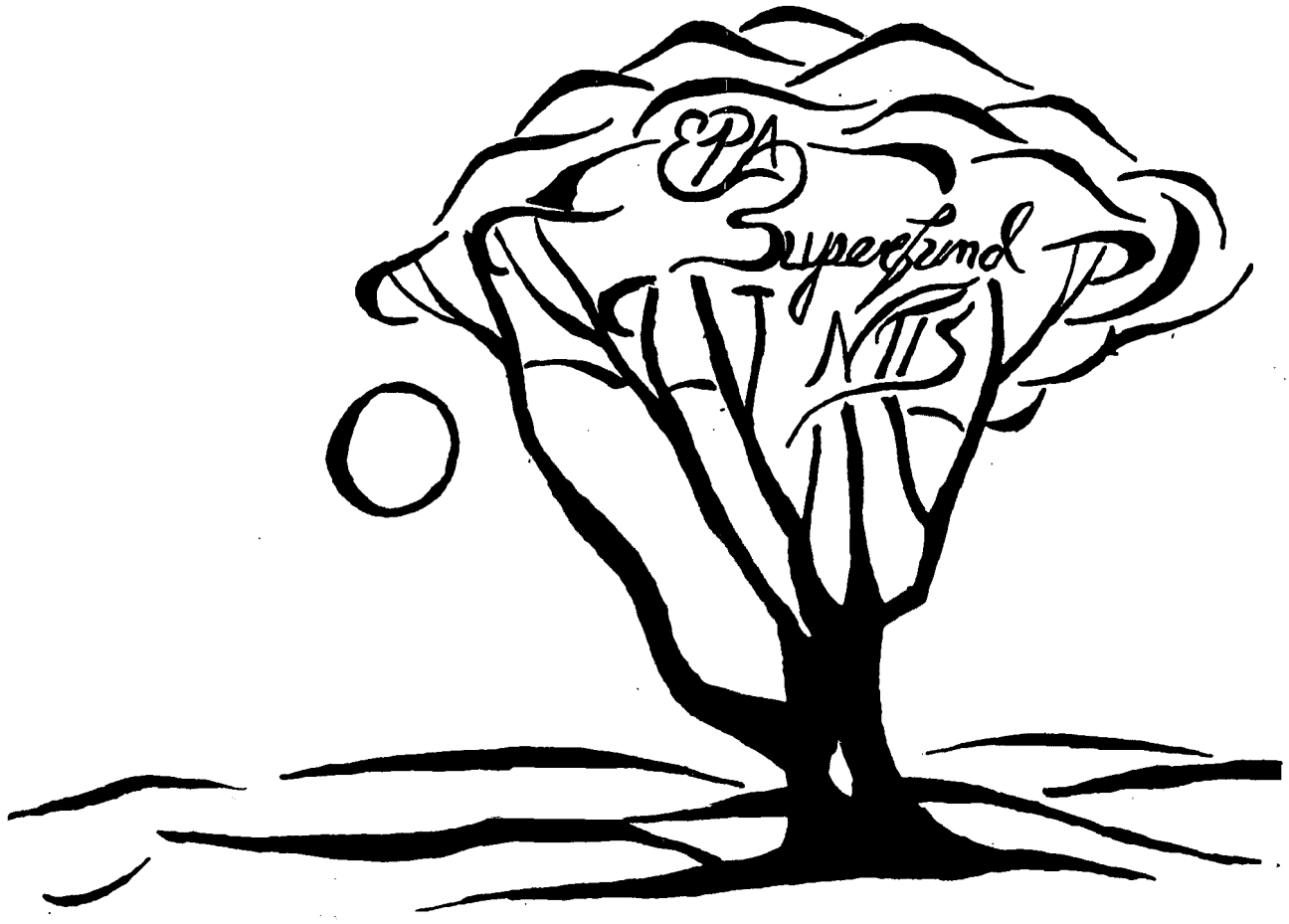
Marine Corps Base, Operable Unit 5 (Site 2), Camp Lejeune, NC, 9/15/94



FINAL

RECORD OF DECISION
OPERABLE UNIT NO. 5 (SITE 2)

MARINE CORPS BASE,
CAMP LEJEUNE, NORTH CAROLINA

CONTRACT TASK ORDER 0174

SEPTEMBER 8, 1994

Prepared For:

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES
ENGINEERING COMMAND
Norfolk, Virginia

Under the:

LANTDIV CLEAN Program
Contract N62470-89-D-4814

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LIST OF ACRONYMS AND ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirement
AWQC	Federal Ambient Water Quality Criteria
Baker	Baker Environmental, Inc.
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	contaminants of concern
COPC	contaminants of potential concern
DoN	Department of the Navy
FS	Feasibility Study
FSA	Former Storage Area
gpm	gallons per minute
HI	hazard index
HQ	hazard quotient
IAS	Initial Assessment Study
ICR	incremental cancer risk
IRP	Installation Restoration Program
LA	Lawn Area
MCB	Marine Corps Base
MCL	Maximum Contaminant Level
MPA	Mixing Pad Area
NC DEHNR	North Carolina Department of Environment, Health, and Natural Resources
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NCWQS	North Carolina Water Quality Standard
NPL	National Priorities List
NPDES	National Pollution Discharge Elimination System
NPW	net present worth
O&M	operation and maintenance

PRAP	Proposed Remedial Action Plan
RAA	remedial action alternative
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
STP	sewage treatment plant
SVOC	semivolatile organic compound
TCE	trichloroethene
TCRA	Time Critical Removal Action
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

DECLARATION

Site Name and Location

Operable Unit No. 5 (Site 2)
Marine Corps Base
Camp Lejeune, North Carolina

Statement of Basis and Purpose

This decision document presents the selected remedy for Operable Unit No. 5 (Site 2) at Marine Corps Base (MCB), Camp Lejeune, North Carolina which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record for the operable unit.

The Department of the Navy (DoN) and the Marine Corps have obtained concurrence from the State of North Carolina Department of Environment, Health and Natural Resources (NC DEHNR) and the United States Environmental Protection Agency (USEPA) Region IV on the selected remedy.

Assessment of the Site

Actual or threatened releases of hazardous substances from this operable unit, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present a potential threat to public health, welfare, or the environment.

Description of Selected Remedy

The selected remedy for Site 2, Institutional Controls/Long-Term Groundwater Monitoring, is the final action to be conducted at this site. A Time Critical Removal Action (TCRA) is planned to be completed prior to that of the selected remedy at the operable unit for the removal of pesticide-contaminated soils and sediment identified during the remedial investigation. The contaminated soils and sediment may present an adverse risk to human

health and the environment, and are potential sources of groundwater contamination. Removal of the contaminated soils will reduce the risk to human health and ecological receptors below environmental risk guidelines set and reviewed by credible organizations. Therefore, no other action will be required for soil or sediment.

The selected remedial action included in this ROD addresses the principal threats remaining (i.e., post-TCRA) at Site 2 by addressing groundwater contamination.

The principal threat, following the implementation of the TCRA, involves the potential ingestion of contaminated groundwater originating from Site 2. The primary objectives of the selected remedy are: (1) to prevent future human exposure to the contaminated groundwater and (2) to insure, through monitoring, that there is no human or environmental exposure due to migration of the contaminant plume off site.

The major components of the selected remedy for this operable unit include:

- Restricting the installation of any new potable water supply wells within the vicinity of Site 2.
- Implementing a long-term groundwater monitoring program to monitor groundwater quality in site monitoring wells and nearby potable water supply wells.

Statutory Determinations

This remedial action is protective of human health and the environment and is cost-effective. Due to the limited nature of the contamination, the small hydraulic gradient of the aquifer horizontal flow, the high potential for treatment via natural biodegradation and attenuation processes, the practicality of employing treatment, and the lack of evidence of a contaminant source, use of treatment to reduce toxicity, mobility, or volume was not deemed feasible to protect human health and the environment, which are not at risk. Therefore, permanent solutions and alternative treatment technologies were not utilized to the maximum extent practicable. Additionally, this remedial action does not satisfy the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element. Similarly, the federal and state groundwater standards that are applicable or relevant and appropriate to the remediation action are not met by the remedial action. Although treatment is not being employed, this remedial action is protective of human health and the environment since there are currently no significant human health or ecological risks

posed by the nature of the groundwater contamination. Future risks are unlikely based on the potential for exposure to contaminants in the shallow groundwater. Because this remedy will result in hazardous substances remaining on site (in terms of contaminated groundwater) above state or federal groundwater standards, a five-year review of this alternative will be necessary in accordance with CERCLA.

Signature (Commanding General, MCB Camp Lejeune)

15 Sept 94

Date

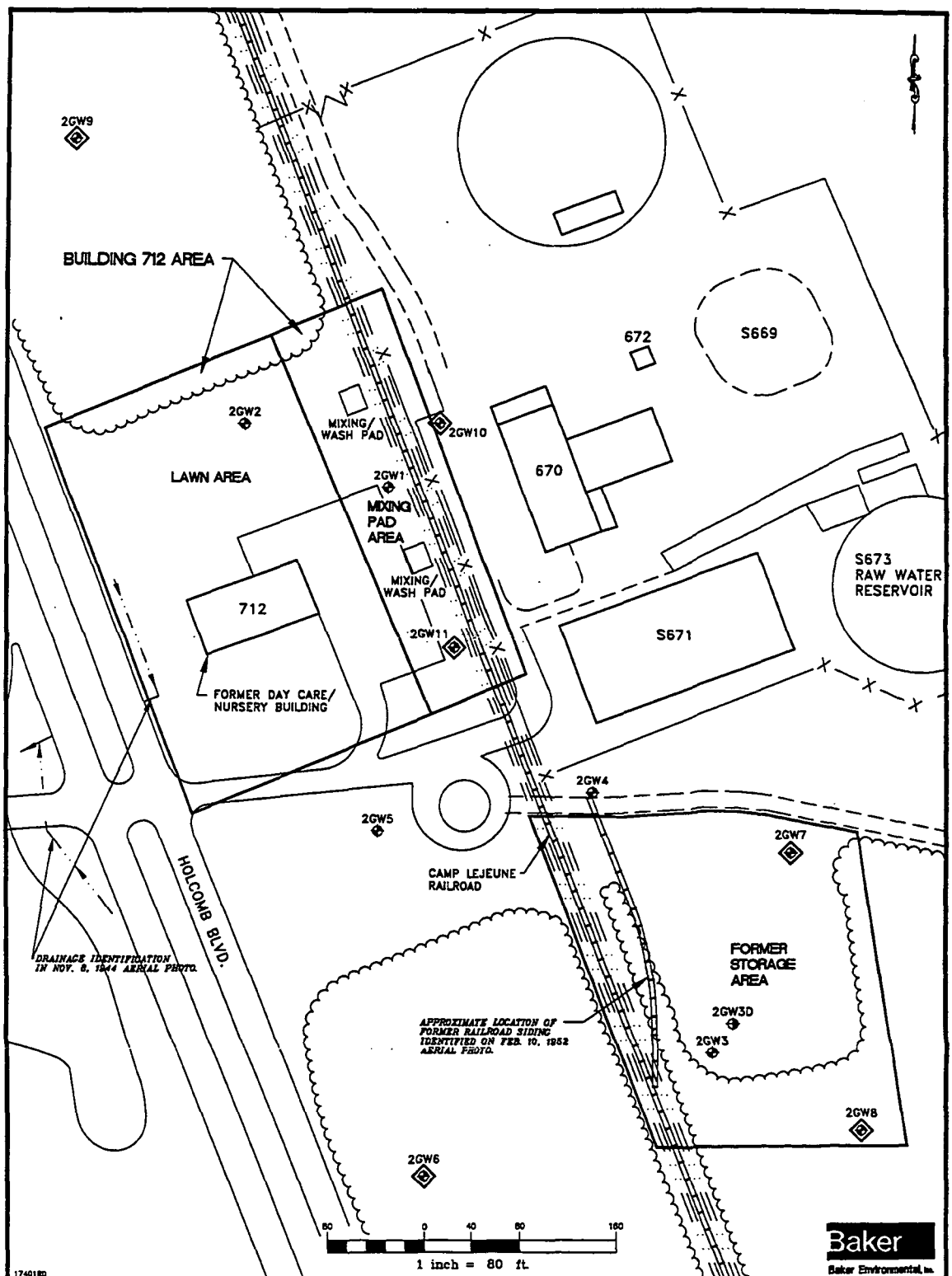
1.0 SITE LOCATION AND DESCRIPTION

Marine Corps Base (MCB), Camp Lejeune is a training base for the U.S. Marine Corps, located in Onslow County, North Carolina. The Base covers approximately 236 square miles and includes 14 miles of coastline. MCB Camp Lejeune is bounded to the southeast by the Atlantic Ocean, to the northeast by State Route 24, and to the west by U.S. Route 17. The town of Jacksonville, North Carolina is located north of the Base (see Figure 1).

The study area, Operable Unit No. 5, is one of 13 operable units within MCB Camp Lejeune. An "operable unit" as defined by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) is a discrete action that comprises an incremental step toward comprehensively addressing site problems. The cleanup of a site can be divided into a number of operable units, depending on the complexity of the problems associated with the site. Operable units may address geographical portions of a site, specific site problems, or initial phases of an action. With respect to MCB Camp Lejeune, operable units were developed to combine one or more individual sites where Installation Restoration Program (IRP) activities are or will be implemented.

Operable Unit No. 5, which covers an area of approximately 5 acres, is made up solely of Site 2. The site is located at the intersection of Holcomb Boulevard and Brewster Boulevard (see Figures 1 and 2). As shown on Figure 2, the site is bordered to the north by a wooded area that generally drains north toward Overs Creek; to the west by Holcomb Boulevard; and to the east by a water treatment plant. Within the site, there are two main areas of concern: the area around Building 712 [including the Lawn Area (LA) and the Mixing Pad Area (MPA)]; and the Former Storage Area (FSA), which is located at the southern portion of the site across the railroad tracks (see Figure 2).

The land at Site 2 is primarily flat, but dips sharply at the drainage ditches which run parallel to the Camp Lejeune Railroad. There is a drainage ditch on both the east and west side of the railroad tracks. Drainage along the eastern edge of the Building 712 area is towards these drainage ditches, which run in a north-northwest direction toward Overs Creek. Drainage along the western edge of the Former Storage Area (FSA) is also towards these drainage ditches. Another drainage ditch extends westward from the Building 712 area, underneath Holcomb Boulevard.



LEGEND

2GW1 EXISTING SHALLOW MONITORING WELL

2GW3D NEWLY INSTALLED SHALLOW MONITORING WELL

2GW3D NEWLY INSTALLED DEEP MONITORING WELL

SOURCE: LANTDIV, FEB. 1992

FIGURE 2
SITE PLAN OF
OPERABLE UNIT No.5, SITE 2
RECORD OF DECISION CTO-0174

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

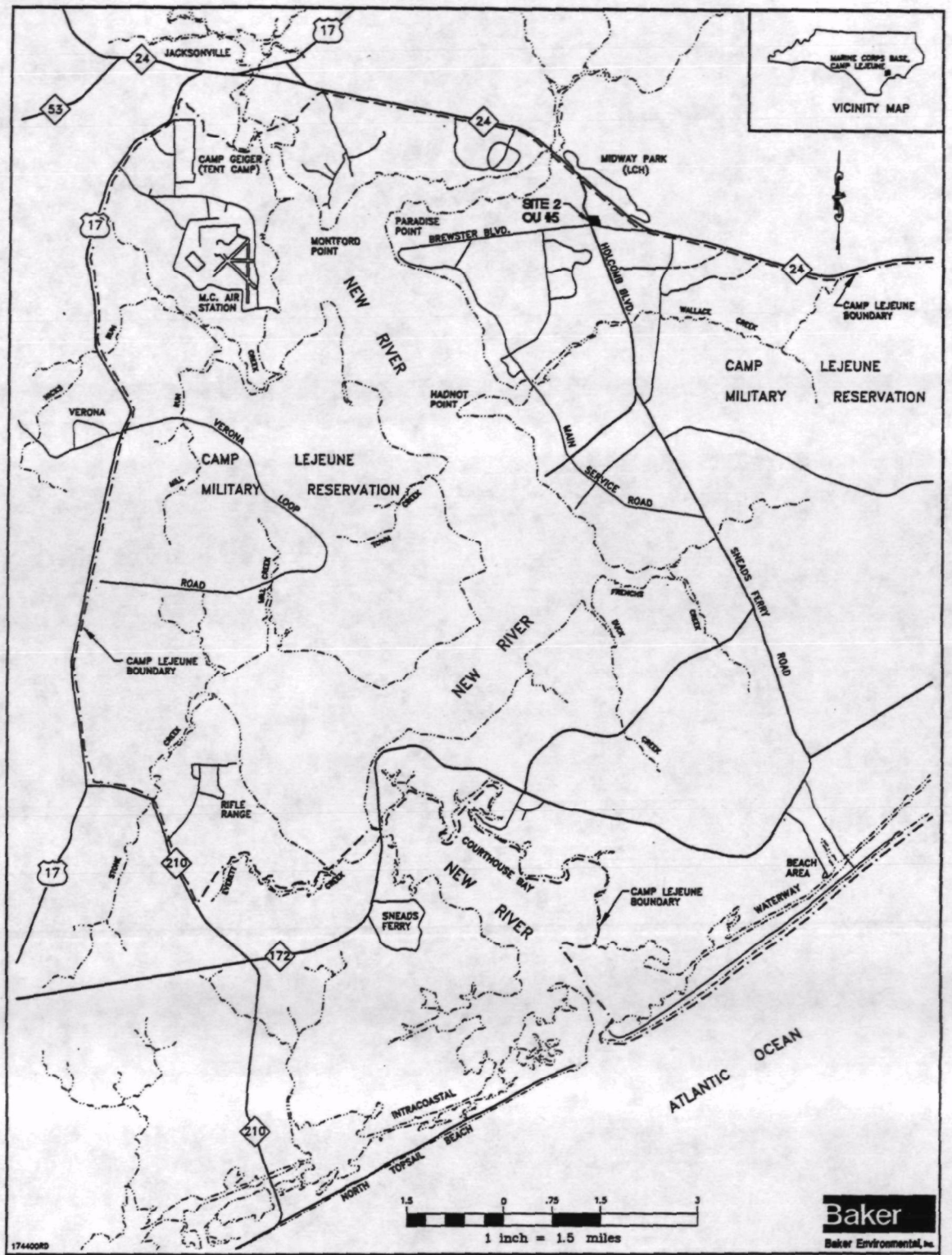


FIGURE 1
LOCATION MAP
OPERABLE UNIT No.5, SITE 2
RECORD OF DECISION CTO-0174

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

This section of the Record of Decision (ROD) provides background information on the site's history and enforcement actions to date. Specifically, the land use history and the previous investigations which have been conducted are briefly discussed.

Site History

From 1945 to 1958, Building 712 was used for the storing, handling, and dispensing of pesticides. Building 712 was later used as a children's day care center. The building is currently used for administrative offices.

Chemicals known to have been used include chlordane, DDT, diazinon, and 2,4-D. Chemicals known to have been stored on site include dieldrin, lindane, malathion, silvex, and 2,4,5-T. Areas of suspected contamination due to previous site operations are the MPA, and the railroad drainage ditch which is adjacent to the MPA. Aboveground horizontal storage tanks were identified near the southern mixing pad area in a 1952 aerial photograph. Contamination at the site is believed to have occurred as a result of small spills, washout and excess product disposal. During the years of operation, it is reasonable to assume several gallons of product used per year; therefore, the estimated quantity involved is on the order of 100 to 500 gallons of liquids containing various concentrations of product. Solid residues in cracks and crevasses may total 1 to 5 pounds.

The FSA was used to store bulk materials and vehicles. The following items,within the FSA, were identified in aerial photos:

- A railroad siding, extending from the main line into the FSA.
- A crane, possibly located on the railroad siding, that was apparently used to unload materials from railroad cars.
- An area of possibly stained surface soil, present along the eastern border of this area.

Previous Investigations

Several of the areas within Site 2 have been investigated for potential contamination due to Marine Corps operations and activities. A brief summary of these investigations is presented below.

In 1983 an Initial Assessment Study (IAS) was conducted at MCB Camp Lejeune which identified a number of areas within the Base, including Site 2, as potential sources of contamination. As a result of this study, the Department of the Navy (DoN) began to further investigate these sites.

During 1984 through 1990, a Confirmation Study was conducted at Site 2 which focused on potential source areas identified in the IAS and the Administrative Record file. The study consisted of collecting a limited number of environmental samples (soil, sediment, surface water, and groundwater) for purposes of constituent analysis. In general, the results detected the presence of pesticides in soils surrounding the MPA, pesticides and low levels of volatile organic compounds (VOCs) in groundwater (monitoring well 2GW3), and pesticides in surface water and sediments.

On October 4, 1989, MCB Camp Lejeune was placed on the National Priorities List (NPL). The DoN, the United States Environmental Protection Agency (USEPA), and the North Carolina Department of Environment, Health, and Natural Resources (NC DEHNR) entered into a Federal Facilities Agreement on February 13, 1991.

In July 1992, a geophysical investigation was performed at Site 2 to determine the source of groundwater contamination near monitoring well 2GW3. No anomalies that could serve as sources (i.e., tanks or drums) of groundwater contamination were identified during this investigation. However, an anomalous subsurface feature was detected near monitoring well 2GW3. The data from this anomaly was not conclusive to ascertain whether or not it was a tank, large diameter utility line or other buried structure.

In January 1994, additional geophysical investigation activities were conducted in the vicinity of this anomalous subsurface feature. This focused reinvestigation determined that there were no subsurface features in this area. The fixture that was apparently detected in July 1992 may have been an echo or interference from monitoring well 2GW3.

Also in 1992, Baker Environmental, Inc. (Baker) implemented a limited groundwater sampling program to obtain preliminary data to scope future remedial investigation (RI) activities. Low levels of VOCs (ethylbenzene, xylene) were again detected in monitoring well 2GW3.

In 1993, Baker conducted a RI field program at Site 2 to characterize potential environmental impacts and threats to human health and the environment resulting from previous storage, operational, and disposal activities. Investigation activities commenced in April 1993 and continued through June 1993. The field program consisted of a preliminary site survey; a geophysical investigation; a soil gas survey; a soil investigation including drilling and sampling; a groundwater investigation including monitoring well installation (shallow and deep wells) and sampling (two rounds); and a surface water and sediment investigation.

Contaminants including pesticides, VOCs, and semivolatile organic compounds (SVOCs) were detected in soil, groundwater, surface water, and sediments during the RI. Table 1 presents a listing of contaminants detected at Site 2.

Pesticides appear to be the predominant contaminants of concern in soils and sediments (mostly near the MPA). VOCs appear to be the contaminants of concern in groundwater in both the surficial (less than 25 feet in depth) and the Castle Hayne (greater than 100 feet in depth) aquifers. Several areas were identified within the site which exhibited significant levels of organic contamination (pesticides). These areas are located primarily in the vicinity of the MPA. Inorganic constituents also are present throughout the site in the various media.

3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Final RI and Feasibility Study (FS) Reports and the Final Proposed Remedial Action Plan (PRAP) for Operable Unit 5 (Site 2) at MCB Camp Lejeune, North Carolina were released to the public on July 21, 1994. These documents were made available to the public at the information repository maintained at the Onslow County Public Library. The notice of availability of the PRAP and RI/FS documents was published in the "Jacksonville Daily News" during the period July 21 through 27, 1994. A public comment period was held from July 27, 1994 to August 27, 1994. In addition, a public meeting was held on July 27, 1994. At this meeting, representatives from the DoN/Marine Corps discussed the remedial action alternatives (RAAs) currently under consideration and addressed community concerns.

TABLE 1

CONTAMINANTS DETECTED WITHIN OPERABLE UNIT NO. 5
RECORD OF DECISION
MCB CAMP LEJEUNE, NORTH CAROLINA

Pesticides	Volatile Organic Compounds	Semivolatile Organic Compounds
4,4'-DDD	Acetone	2,4-Dimethylphenol
4,4'-DDE	Dichloroethene	Acenaphthene
4,4'-DDT	Benzene	Anthracene
Alpha Chlordane	Bromomethane	Benzo(a)anthracene
Dieldrin	Dichloromethane	Benzo(a)pyrene
Endrin	Ethylbenzene	Benzo(b)fluoranthene
Endosulfan II	Trichloroethene	Benzo(k)fluoranthene
Gamma Chlordane	Toluene	Chrysene
Heptachlor	Xylene (total)	Fluoranthene
	trans-1,2-Dichloroethene	Fluorene
	Trichloroethene	Naphthalene
Inorganics	Vinyl Chloride	n-Nitrosodiphenylamine
Aluminum	2-Butanone	Phenanthrane
Arsenic	4-Methyl-2-pentanone	Phenol
Barium	Methylene Chloride	Pyrene
Beryllium		2-Methylnaphthalene
Chromium		Di-n-butyl phthalate
Copper		Bis(2-ethylhexyl)phthalate
Iron		
Lead		
Manganese		
Mercury		
Selenium		
Silver		
Vanadium		

Response to the comments received during the comment period is included in the Responsiveness Summary, which is part of this ROD (Section 11.0).

This decision document presents the selected RAA for Site 2 at MCB Camp Lejeune, North Carolina, chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by Superfund Amendments and Reauthorization Act (SARA) and, to the extent practicable, the NCP. The selected decision for Site 2 is based on the Administrative Record.

4.0 SCOPE AND ROLE OF THE RESPONSE ACTION

The selected remedy for Site 2 is the final action to be conducted at the operable unit. A Time-Critical Removal Action (TCRA) will be implemented at the operable unit for the removal of contaminated soil and sediment identified within the operable unit which may pose a threat to human health and/or the environment. The contaminated soil and sediment are also potential sources of groundwater contamination.

The TCRA will consist of excavation and disposal of pesticide-contaminated soil and sediment in the vicinity of the MPA. Soil and sediment cleanup levels have been calculated for the following pesticide contaminants:

Contaminant of Concern	Soil Cleanup Level (µg/kg)	Sediment Cleanup Level (µg/kg)
4,4'-DDT	3,000	15,000
4,4'-DDE	3,000	15,000
4,4'-DDD	4,000	21,000
Dieldrin	50	--
Heptachlor	179	--
Chlordane (total)	621	4,000

These cleanup levels are based on achieving an incremental cancer risk (ICR) of 1E-6. Confirmation samples will be collected from the excavation to insure that these cleanup levels are achieved. It is estimated that 500 cubic yards of soil and sediment will be excavated and transported off site for treatment and disposal.

Surface water and sediment, which are located outside of the TCRA area, will not be addressed under this action for the following reasons:

- The overall risk to human health and the environment posed by Overs Creek is below environmental risk guidelines set and reviewed by credible organizations.

- The removal of on-site contaminated soils and sediments will mitigate the potential for site contaminants to migrate off site to Overs Creek.

- Direct treatment of surface water or sediment may result in a greater risk to the environment.

The selected remedial action authorized by this ROD addresses contaminated shallow groundwater in the vicinity of the FSA. Currently, there is no risk to human health since shallow groundwater is not utilized as a source of drinking water. However, under worst-case conditions, groundwater may pose a potential threat to human health and the environment because of the risks from future possible ingestion. Therefore, the objectives of the selected remedy are: (1) to prevent future human exposure to the contaminated groundwater and (2) to insure, through monitoring, that there is no human or environmental exposure due to migration of the contaminant plume off site.

5.0 SITE CHARACTERISTICS

This section of the ROD presents an overview of the nature and extent of contamination at Site 2 with respect to known or suspected sources of contamination, types of contamination, and affected media. Based on the results of the RI, potential sources of contamination were identified. The nature and extent of the contamination identified at Site 2 are itemized below.

- Soil in the vicinity of the MPA has been impacted by pesticide contamination. This is apparently the result of releases associated with pesticide mixing and washing of pesticide and herbicide spraying equipment. The soil in this area has also been impacted by SVOC contamination. This is apparently the result of petroleum-based solvents or fuels (possibly diesel fuel) being used as a carrying agent for herbicide mixtures and to operate and clean spraying equipment.

- Sediment in the railroad track drainage ditches in the vicinity of the MPA has been impacted by pesticide contamination. This is apparently the result of releases associated with pesticide mixing and washing of pesticide and herbicide spraying equipment. SVOCs have also been detected in sediment samples collected in this area. This is apparently the result of releases associated with herbicide mixing and the cleaning (possibly with diesel fuel) of pesticide and herbicide spraying equipment.

- Soil throughout Site 2 (i.e., outside of the MPA) has been impacted by pesticide contamination that resulted from the former practice of general base-wide spraying of pesticides. The pesticide concentrations in soil in the LA and FSA are several orders of magnitude lower than the pesticide contaminant concentrations detected in the vicinity of the MPA.

- Shallow groundwater in the FSA has been impacted by VOC contamination. Ethylbenzene and xylene (total) were detected in groundwater samples collected from shallow monitoring wells in the FSA. The area of highest VOC concentration is at monitoring well 2GW3. VOCs have been detected in this monitoring well during previous investigations. The extent of VOC contamination appears to be limited to the shallow groundwater in the vicinity of the FSA.

  The source of the shallow groundwater contamination in the FSA has not been determined. Similar contaminants were detected in low levels in one soil boring in the vicinity of monitoring well 2GW3, indicating that the source may have been at or near the surface in this area (e.g., surface spill, etc.).

- Inorganics were detected in groundwater samples collected from shallow monitoring wells at the site. Several of these analytes exceeded federal and/or North Carolina groundwater quality standards. The distribution of detected inorganics in shallow groundwater followed no discernible pattern that would indicate a likely source. Additionally, inorganic levels in soil were not elevated to the point where soil would be believed to be considered as the source of groundwater contamination. Many of the highest concentrations of inorganics were detected in background monitoring wells (2GW9, 2GW8). The concentrations of detected inorganics is much greater in the unfiltered (total) samples than in the filtered (dissolved) samples. This indicates that the inorganics detected in groundwater samples at Site 2 may be due predominantly to the presence of soil particles entrained in the groundwater samples and may not be

attributable to site operations. Some inorganics (arsenic, lead, barium, beryllium, and vanadium) were nonetheless retained as chemicals of potential concern in the baseline risk assessment.

- Pesticides (4,4'-DDD and 4,4'-DDT) were detected in low concentrations (less than 10 µg/L) in groundwater samples collected from shallow monitoring wells at the site. The distribution of detected pesticides in shallow groundwater followed no discernible pattern that would indicate a likely source (such as the Mixing Pad Area). Pesticides were detected in a background well (2GW8). This indicates that the pesticides detected in groundwater samples at Site 2 may be due predominantly to the presence of pesticide-contaminated soil particles entrained in the groundwater samples.

- The VOC, trichloroethene (TCE) was detected at a low concentration (5 µg/L) in deep monitoring well 2GW3D. There is no evidence (documentation, soil samples, shallow groundwater samples) to indicate that this contamination is related to operation activities at Site 2. TCE and other chlorinated hydrocarbons have been detected in deep groundwater in other areas at MCB Camp Lejeune. TCE was not detected in this monitoring well during the second round of groundwater sampling.

- Trace levels of pesticides were detected in surface water samples collected in the railroad drainage ditches. This may be the result of Site 2 operations or general base-wide spraying. Copper was detected above applicable Freshwater Water Quality Screening Values (FWQSVs), North Carolina Water Quality Standards (NCWQs), and Federal Ambient Water Quality Criteria (AWQC) applicable to Overs Creek.

6.0 SUMMARY OF SITE RISKS

As part of the RI, a human health risk assessment and an ecological risk assessment were conducted to evaluate the current and/or future potential risks to human health and the environment resulting from the presence of contaminants identified at Site 2. A summary of the key findings from both of these studies is presented below.

Human Health Risk Assessment

The human health risk assessment was conducted for several environmental media including surface soil, subsurface soil, groundwater, surface water, and sediments. Contaminants of

potential concern (COPC) for each of these media were selected based on prevalence, mobility, persistence, and toxicity.

At the time when RI laboratory analytical results became available and were initially compiled, MCB Camp Lejeune/DoN determined that a TCRA was appropriate for the pesticide-contaminated soil and sediment in the vicinity of the MPA. Because a TCRA will be implemented, the baseline risk assessment (included in the RI Report) considered risks to human health and the environment at this site under two scenarios:

- Risks to human health and the environment without (or before) the TCRA.
- Risks to human health and the environment with (or after) the TCRA.

Table 2 lists the COPC which were identified and assessed for each media. Note that COPC with respect to before and after the TCRA are presented on the table. For soil, groundwater, and sediment COPC included VOCs, SVOCs, pesticides, and inorganics. The surface water COPC included pesticides and inorganics.

The exposure routes evaluated in the human health risk assessment included ingestion, dermal contact, and particulate inhalation of surface soils; future potential ingestion and dermal contact of groundwater; and ingestion and dermal contact of surface water and sediments. Several exposed populations were evaluated in the risk assessment with respect to both current and future potential scenarios for the operable unit. For surface soil, current civilian base personnel and future on-site residents (adults and children) were retained as potential exposed populations. For groundwater future on-site residents (adults and children) were retained as potential exposed populations. Adults and adolescents were retained for current surface water and sediment exposures, while adults and children (1-6 years) were retained for future evaluation. In addition, subsurface soil was evaluated for the future construction worker.

As part of the risk assessment, ICRs and hazard indices (HIs) were calculated for each of the potentially exposed populations. An ICR refers to the cancer risk that is over and above the background cancer risk in unexposed individuals. ICRs are determined by multiplying the intake level with the cancer potency factor. The calculated risks are probabilities which are typically expressed in scientific notation (e.g., 1E-4). For example, an ICR of 1E-4 means that one additional person out of ten thousand may be at risk of developing cancer due to excessive exposure at the site if no actions are conducted. The USEPA acceptable target risk range is

TABLE 2

SUMMARY TABLE OF CHEMICALS OF POTENTIAL CONCERN FOR OPERABLE UNIT NO. 5, SITE 2
RECORD OF DECISION
MCB CAMP LEJEUNE, NORTH CAROLINA

Chemical of Potential Concern	Lawn and Mixing Pad Areas		Lawn and Mixing Pad Areas Time-Critical Removal Action		Former Storage Area		Former Storage Area Time-Critical Removal Action	
	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil
Volatile Organics								
Ethylbenzene						X		X
Toluene					X	X	X	X
Xylene (total)	X	X	X	X	X	X	X	X
Semivolatile Organics								
Acenaphthene		X						
Anthracene		X						
Fluoranthene		X						
Fluorene		X						
2-Methylnaphthalene		X						
Naphthalene		X						
N-Nitrosodiphenylamine		X						
Phenanthrene		X						
Pyrene		X						
Pesticides								
alpha-Chlordane	X	X	X	X				
gamma-Chlordane	X	X	X	X				
4,4'-DDD	X	X	X	X	X	X	X	X
4,4'-DDE	X	X	X	X	X	X	X	X
4,4'-DDT	X	X	X	X	X	X	X	X
Dieldrin	X							
Heptachlor	X	X						
Inorganics								
Arsenic	X	X	X			X		X

TABLE 2 (Continued)

SUMMARY TABLE OF CHEMICALS OF POTENTIAL CONCERN FOR OPERABLE UNIT NO. 5, SITE 2
RECORD OF DECISION
MCB CAMP LEJEUNE, NORTH CAROLINA

Chemical of Potential Concern	Groundwater	Surface Water Drainage Ditches	Sediment Railroad Drainage Ditches	Sediment Time-Critical Removal Action Railroad Drainage Ditches	Sediment Overs Creek
Volatile Organics					
Ethylbenzene	X		X		
Trichloroethene	X				
Xylene (total)	X		X		
Semivolatile Organics					
Acenaphthene	X				
2-Methylnapthalene	X		X		
2,4-Dimethylphenol	X				
Naphthalene	X		X		
Phenol	X				
Pesticides					
alpha-Chlordane			X	X	
gamma-Chlordane			X	X	
4,4'-DDD	X	X	X	X	X
4,4'-DDE			X	X	X
4,4'-DDT	X	X	X	X	X
Dieldrin			X	X	
Endofulfan II			X		
Inorganics					
Arsenic	X	X	X		X
Barium	X				
Beryllium	X	X			
Lead	X				
Vanadium	X				

Note: X = denotes chemical was retained as a chemical of potential concern

1E-4 to 1E-6. Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the HI can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. The HI refers to noncarcinogenic effects and is a ratio of the level of exposure to an acceptable level for all COPC. An HI greater than or equal to unity (i.e., 1.0) indicates that there may be a concern for noncarcinogenic health effects. Table 3 presents a summary of ICRs and HIs calculated for Site 2 with respect to before and after the TCRA.

After completion of the TCRA, total risk for civilian base personnel and construction worker receptors will have ICRs less than 1E-6 and HIs less than 1.0. Site risks remain (i.e., ICR greater than 1.0E-04 and HI greater than 1.0) for the child resident and adult resident (future) receptors due to groundwater contamination.

The total site risk at Overs Creek indicates that contamination from Site 2 is not appreciably migrating to the creek, and that adverse human health risks are not expected to occur due to contamination at Overs Creek.

Total risks remaining after the TCRA are attributable to contamination in the shallow groundwater on site. Therefore, the FS focused on developing remedial action alternatives for mitigating these risks. As groundwater was determined to be the media of concern at this site, groundwater COPC were reclassified as contaminants of concern (COC) in the FS.

Ecological Risk Assessment

An ecological risk assessment was conducted at Site 2 in conjunction with the RI. The objective of this risk assessment was to determine if past reported disposal activities are adversely impacting the ecological integrity of the terrestrial and aquatic habitats on, or adjacent to the site.

The results of the ecological risk assessment indicated the following:

- Pesticides in sediments along the drainage ditch and Overs Creek result in a potential decrease in the viability of aquatic receptors under both the no TCRA and the TCRA scenarios.

TABLE 3

TOTAL SITE INCREMENTAL LIFETIME CANCER RISK AND HAZARD INDICES
RECORD OF DECISION
OPERABLE UNIT NO. 5 (SITE 2)
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Receptors	Lawn and Mixing Pad Areas		Lawn and Mixing Pad Areas - Time Critical Removal Action		Former Storage Area		Former Storage Area - Time Critical Removal Action		Overs Creek	
	ICR	HI	ICR	HI	ICR	HI	ICR	HI	ICR	HI
Civilian Base Personnel	1E-4	1.3	5E-7	0.008	3E-7	0.004	3E-8	3E-4	--	--
Construction Worker	6E-7	0.1	1E-10	6E-5	4E-8	.005	4E-8	.005	--	--
Child Resident (future potential)	2E-3	111	3E-4	11	3E-4	12	3E-4	11	--	--
Adult Resident (future potential)	2E-3	23	7E-4	5	7E-4	5	7E-4	5	--	--
Trespassing Child (future potential)	--	--	--	--	--	--	--	--	1E-7	1E-3
Trespassing Adult (future potential)	--	--	--	--	--	--	--	--	9E-8	3E-4

Notes: ICR = Incremental Lifetime Cancer Risk
HI = Hazard Index

Shading indicates that risk level is not within or fell above acceptable levels.

- Pesticides in the soil in the MPA result in a potential decrease in the viability of terrestrial receptors under the no TCRA scenario. Under the TCRA scenario, there is no decrease in the viability of terrestrial receptors.

- There is no decrease in viability of aquatic or terrestrial receptors in the FSA under either the no TCRA scenario or the TCRA scenario.

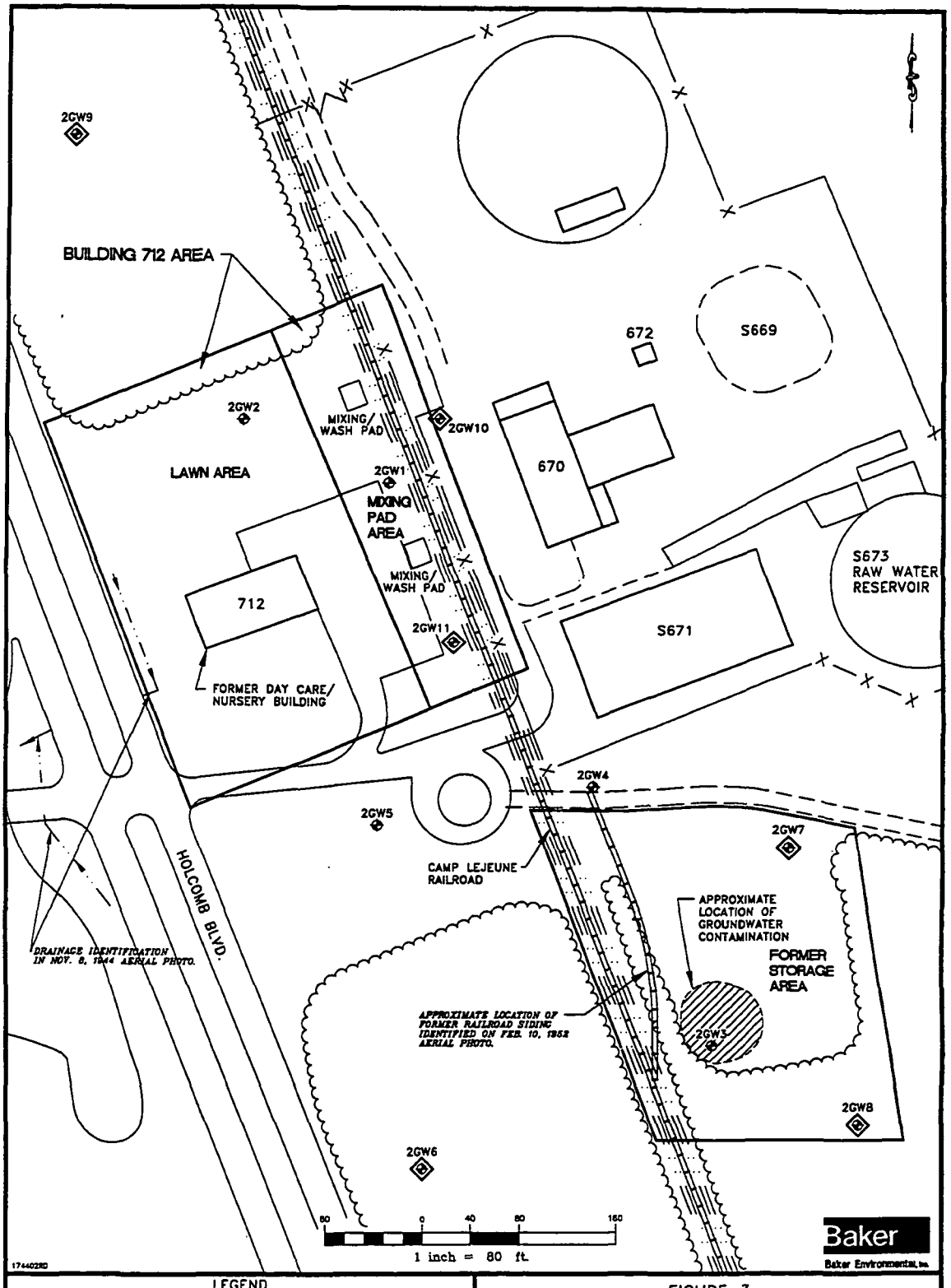
7.0 DESCRIPTION OF ALTERNATIVES

Soil and sediment in the vicinity of the MPA exhibit elevated concentrations of pesticide contaminants. However, these are being addressed in the TCRA. After the contaminated soils/sediments are removed, the potential human health risks associated with these two media will be reduced to an acceptable level, as indicated by an ICR value between 1E-4 to 1E-6 and an HI below 1.0. The remedial action alternatives (RAAs) were therefore developed to address contaminated groundwater at Site 2. Groundwater contamination is restricted to shallow groundwater in the FSA, near monitoring well 2GW3, where elevated levels of ethylbenzene (190 µg/L) and total xylenes (1800 µg/L) were detected. Figure 3 shows the general location of shallow groundwater contamination.

Based on the above, six groundwater RAAs were developed and evaluated in the FS. A glossary of evaluation criteria is presented on Table 4. A brief overview of each of the RAAs is included below. All costs and implementation times are estimated.

The following groundwater RAAs were developed and evaluated for Site 2:

- RAA No. 1 No Action
- RAA No. 2 Institutional Controls/Long-Term Groundwater Monitoring
- RAA No. 3 Collection/Treatment/Discharge to a Sewage Treatment Plant
- RAA No. 4 Collection/Discharge to a Sewage Treatment Plant
- RAA No. 5 Collection/Discharge to Site 82 (Operable Unit No. 2)
- RAA No. 6 In Situ Treatment



LEGEND

2GW1 EXISTING SHALLOW MONITORING WELL

2GW30 NEWLY INSTALLED SHALLOW MONITORING WELL

SOURCE: LANTDIV, FEB. 1992

FIGURE 3
APPROXIMATE LOCATION OF SHALLOW
GROUNDWATER CONTAMINATION
OPERABLE UNIT No.5, SITE 2
RECORD OF DECISION CTO-0174
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

TABLE 4

GLOSSARY OF EVALUATION CRITERIA

- **Overall Protection of Human Health and Environment** - addresses whether or an alternative provides adequate protection and describes how risks posed thro each pathway are eliminated, reduced, or controlled through treatment engineer controls or institutional controls.

- **Compliance with ARARs** - addresses whether or not an alternative will meet a the applicable or relevant and appropriate requirements (ARARs) or other Federal State environmental statutes.

- **Long-term Effectiveness and Permanence** - refers to the magnitude of resi risk and the ability of an alternative to maintain reliable protection of human he and the environment over time once cleanup goals have been met.

- **Reduction of Toxicity, Mobility, or Volume through Treatment** - is anticipated performance of the treatment options that may be employed i alternative.

- **Short-term Effectiveness** - refers to the speed with which the alternative ach protection, as well as the remedy's potential to create adverse impacts on hu health and the environment that may result during the construction implementation period.

- **Implementability** - is the technical and administrative feasibility of an alterna including the availability of materials and services needed to implement the c solution.

- **Cost** - includes capital and operation and maintenance costs. For compa purposes, presents present worth values.

- **USEPA/State Acceptance** - indicates whether, based on review of the RI a reports and the PRAP, the USEPA and State concur with, oppose, or ha comments on the preferred alternative.

- **Community Acceptance** - evaluates the issues and concerns the public ma regarding each of the RAAs. This criterion is addressed in the ROD on comments on the RI/FS reports and the PRAP have been received.

Common Elements - Common elements between the RAAs are listed below.

- RAAs 2 through 6 will include institutional controls such as a long-term groundwater monitoring, and restrictions on the future use of the site and on the installation of potable water supply wells near the site. The monitoring activities will be conducted to gauge the effectiveness of the selected remedy. Restrictions will be placed on the operable unit to prohibit the installation of any new potable water supply wells in this area.

- RAAs 3 through 5 will include the extraction of contaminated groundwater followed by on-site or off-site treatment and discharge.

A description of each alternative as well as the estimated capital costs, annual operation and maintenance (O & M) costs, the net present worth (NPW) and timeframe to implement the alternative follows. The NPW is calculated over a period of 30 years, at a 5 percent interest rate:

- **RAA No. 1: No Action**

  Capital Cost: $0
  Annual O&M Costs: $0
  NPW: $0
  Months to Implement: None

  The No Action RAA is required under CERCLA to establish a baseline for comparison. Under this RAA, no further action at the operable unit will be implemented.

- **RAA No. 2: Institutional Controls/Long-Term Groundwater Monitoring**

  Capital Cost: $0
  Annual O&M Costs: $57,000 for Years 1 and 2, $28,550 for Years 3 through 5, and $15,475 for Years 6 through 30
  NPW: $350,000
  Months to Implement: 3

  RAA No. 2 will include the institutional controls that are common with RAA Nos. 2 through 6, as mentioned previously. The long-term monitoring program will consist of quarterly sampling and analysis of the groundwater from 12 existing monitoring wells and 3 nearby operational water supply wells for a period of two years. Samples will be collected semiannually during years three to five. Restrictions will be implemented

which will restrict the installation of any new potable water supply wells within the vicinity of Site 2. After five years, the site will be reviewed, and the long-term monitoring program may be adjusted to annual sampling.

- **RAA No. 3: Collection/Treatment/Discharge to a Sewage Treatment Plant**

Capital Cost: $303,000
Annual O&M Costs: $162,760 for Years 1 and 2, $134,210 for Years 3 through 5, and $119,935 for Years 6 through 30
NPW: $1.89 million
Months to Implement: 15

Under RAA No. 3, the contaminated groundwater plume originating in the FSA near monitoring well 2GW3 will be extracted and treated on site. A network of three shallow extraction wells will be placed along the boundary of the plume. Each extraction well will be installed to a depth of 35 feet and pumped at a rate of approximately 5 gallons per minute (gpm). The extracted groundwater will be treated on site via a combination of applicable treatment options (or treatment train), and then discharged through a force main to a sanitary sewer which discharges to the Hadnot Point Sewage Treatment Plant (STP). The treatment train may consist, but not be limited to, filtration, neutralization, precipitation, air stripping, and activated carbon adsorption.

The overall objective of this RAA is to reduce the COC in the groundwater to drinking water standards for Class I aquifers and to mitigate the potential for further migration of the existing groundwater plume. The cone of influence created by extraction wells are expected to reach the downgradient boundary of the plume. Groundwater extraction and treatment will be employed until the remediation objectives are met. In addition, this RAA includes the same institutional controls as Groundwater RAA No. 2.

- **RAA No. 4: Collection/Discharge to a Sewage Treatment Plant**

  Capital Cost: $210,000
  Annual O&M Costs: $106,220 for Years 1 and 2, $177,670 for Years 3 through 5, and $63,395 for Years 6 through 30
  NPW: $1.3 million
  Months to Implement: 15

  Under RAA No. 4, the contaminated groundwater plume originating in the FSA near monitoring well 2GW3 will be extracted via an extraction well system as discussed for RAA No.3, and discharged untreated through a force main to a sanitary sewer, which discharges to the Hadnot Point STP.

  The overall objective of this RAA is to reduce the COC in the groundwater to drinking water standards for Class I aquifers and to mitigate the potential for further migration of the existing groundwater plume. The cone of influence created by extraction wells are expected to reach the downgradient boundary of the plume. Groundwater extraction and treatment will be employed until the remediation objectives are met. In addition, this RAA includes the same institutional controls as Groundwater RAA Nos. 2 and 3.

- **RAA No. 5: Collection/Discharge to Site 82 (O.U. No.2)**

  Capital Cost: $323,000
  Annual O&M Costs: $108,220 for Years 1 and 2, $79,670 for Years 2 through 5, and $65,395 for Years 6 through 30
  NPW: $1.44 million
  Months to Implement: 15

  Under RAA No. 5, the contaminated groundwater plume originating in the FSA near monitoring well 2GW3 will be extracted via an extraction well system as discussed for RAA No.3, and discharged untreated through a force main to a groundwater treatment system to be constructed at Site 82. At Site 82, the extracted groundwater will be treated via a treatment train similar to the one mentioned in RAA No. 3 (with the exception of size). Treated groundwater will be discharged to Wallace Creek.

  The overall objective of this RAA is to reduce the COC in the groundwater to drinking water standards for Class I aquifers and to mitigate the potential for further migration of the existing groundwater plume. In addition, this RAA includes the same institutional controls as Groundwater RAA Nos. 2, 3, and 4.

- **RAA No. 6: In Situ Treatment**

  Capital Cost: $124,000
  Annual O&M Costs: $113,440 for Years 1 and 2, $84,890 for Years 3 through 5, and $70,615 for Years 6 through 30
  NPW: $1.32 million
  Months to Implement: 15

  Under RAA No. 6, the contaminated groundwater plume originating in the FSA near monitoring well 2GW3 will be remediated via an air sparging and soil vapor extraction system. In this method, air will be injected into the groundwater through air sparging wells. The air acts to strip and remove the VOC contaminants from the groundwater. Soil venting wells will be placed to control air flow and to collect vapors within the vadose zone. The collected vapors would be treated to remove the contaminants prior to the air being vented to the atmosphere. No groundwater is removed in this alternative, therefore, groundwater does not have to be discharged to a STP or a watercourse.

  The objective of this RAA is to reduce the COC in the groundwater to levels that meet drinking water standards for Class I aquifers, and to reduce the potential for further migration of the existing groundwater plume at Site 2. In addition, this RAA includes the same institutional controls as Groundwater RAA Nos. 2, 3, 4, and 5.

8.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

A detailed analysis was performed on the groundwater RAAs using the nine evaluation criteria in order to select a site remedy. Table 5 presents a summary of this detailed analysis for the RAAs. A brief summary of each alternative's strengths and weaknesses with respect to the evaluation criteria follows. A glossary of the evaluation criteria has previously been noted on Table 4.

Overall Protection of Human Health and the Environment

RAA No. 1 (No Action) does not provide protection to human health or the environment. Under the Institutional Controls/Long-Term Groundwater Monitoring RAA (No. 2), institutional controls will provide protection to human health, although the potential for further migration of the contaminated groundwater still exists. All of the remaining

TABLE 5

SUMMARY OF DETAILED ANALYSIS - GROUNDWATER RAAs
RECORD OF DECISION
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MCB CAMP LEJEUNE, NORTH CAROLINA

Evaluation Criteria	RAA No. 1 No Action	RAA No. 2 Institutional Controls/Long-Term Groundwater Monitoring	RAA No. 3 Collection/Treatment/ Discharge to a STP	RAA No. 4 Collection/Discharge to a STP	RAA No. 5 Collection/Discharge to Site 82	RAA No. 6 In-Situ Treatment
OVERALL PROTECTIVENESS						
• Human Health Protection	No reduction in risk.	Institutional controls provide protection against risk from groundwater ingestion.	Groundwater plume treated. Pump and treat provides protection against future potential risk from groundwater ingestion.	Groundwater plume treated. Pump and treat provides protection against future potential risk from groundwater ingestion.	Groundwater plume treated. Pump and treat provides protection against future potential risk from groundwater ingestion.	Groundwater plume treated. In-situ treatment provides protection against future potential risk from ingestion.
• Environmental Protection	Allows continued contamination of the groundwater.	Allows continued contamination of the groundwater. Potential natural attenuation of organic contaminants over time.	Migration of contaminated groundwater is reduced by pump and treat.	Migration of contaminated groundwater is reduced by pump and treat.	Migration of contaminated groundwater is reduced by pump and treat.	Level of groundwater contamination is reduced by in situ treatment.
COMPLIANCE WITH ARARs						
• Chemical-Specific ARARs	Will exceed Federal and/or NC groundwater quality ARARs.	Will exceed Federal and/or NC groundwater quality ARARs.	Should meet Federal and NC groundwater quality ARARs in time.	Should meet Federal and NC groundwater quality ARARs in time.	Should meet Federal and NC groundwater quality ARARs in time.	Should meet Federal and NC groundwater quality ARARs in time.
• Location-Specific ARARs	Not applicable.	Not applicable.	Will meet location-specific ARARs.	Will meet location-specific ARARs.	Will meet location-specific ARARs.	Will meet location-specific ARARs.
• Action-Specific ARARs	Not applicable.	Not applicable.	Will meet action-specific ARARs.	Will meet action-specific ARARs.	Will meet action-specific ARARs.	Will meet action-specific ARARs.
LONG-TERM EFFECTIVENESS AND PERMANENCE						
• Magnitude of Residual Risk	As migration of groundwater continues, potential risks may increase.	Risk reduced to human health since the use of the groundwater aquifer is restricted.	Risk reduced by extracting contaminated groundwater.	Risk reduced by extracting contaminated groundwater.	Risk reduced by extracting contaminated groundwater.	Risk reduced by in-situ treatment of contaminated groundwater.
• Adequacy and Reliability of Controls	Not applicable - no controls.	Institutional controls are reliable if strictly enforced.	Groundwater pump and treat is reliable.	Groundwater pump and treat is reliable.	Groundwater pump and treat is reliable.	In-situ treatment demonstrated for COCs
• Need for 5-year Review	Review would be required to ensure adequate protection of human health and the environment is maintained.	Review would be required to ensure adequate protection of human health and the environment is maintained.	Review not needed once remediation goals are met.	Review not needed once remediation goals are met.	Review not needed once remediation goals are met.	Review not needed once remediation goals are met.
REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT						
• Treatment Process Used	None.	None.	Treatment train for metals removal, air stripping, and activated carbon.	Physical and biological treatment at STP.	Treatment train at Site 82 for metals removal, air stripping, and activated carbon.	In-situ air sparging and soil venting for VOC removal.
• Amount Destroyed or Treated	None.	None.	Majority of contaminants in groundwater.	Majority of contaminants in groundwater.	Majority of contaminant in groundwater plumes.	Majority of contaminant in groundwater plumes.

TABLE 5 (Continued)

SUMMARY OF DETAILED ANALYSIS - GROUNDWATER RAAs
RECORD OF DECISION
OPERABLE UNIT NO. 5 (SITE 2)
MCB CAMP LEJEUNE, NORTH CAROLINA

Evaluation Criteria	RAA No. 1 No Action	RAA No. 2 Institutional Controls/Long-Term Groundwater Monitoring	RAA No. 3 Collection/Treatment/ Discharge to a STP	RAA No. 4 Collection/Discharge to a STP	RAA No. 5 Collection/Discharge to Site 82	RAA No. 6 In-Situ Treatment
• Reduction of Toxicity, Mobility or Volume	None.	None.	Reduced volume and toxicity of contaminated groundwater.	Reduced volume and toxicity of contaminated groundwater.	Reduced volume and toxicity of contaminated groundwater.	Reduced volume and toxicity of contaminated groundwater.
• Residuals Remaining After Treatment	Not applicable - no treatment.	Not applicable - no treatment.	Minimal residuals after goals are met.	Minimal residuals after goals are met.	Minimal residuals after goals are met.	Minimal residuals after goals are met.
• Statutory Preference for Treatment	Not satisfied.	Not satisfied.	Satisfied.	Satisfied.	Satisfied.	Satisfied.
SHORT-TERM EFFECTIVENESS						
• Community Protection	Risks to community not increased by remedy implementation.	Risks to community not increased by remedy implementation.	Potential risks to public health and environment during extraction and treatment due to equipment failure.	Potential risks to public health and environment during extraction and treatment due to equipment failure.	Potential risks to public health and environment during extraction and treatment due to equipment failure.	Potential risks to public health and environment during extraction and treatment due to equipment failure.
• Worker Protection	No significant risk to workers.	No significant risk to workers.	Protection required during treatment.	Protection required during treatment.	Protection required during treatment.	Protection required during treatment.
• Environmental Impacts	None	None	None	None	None	None
• Time Until Action is Complete	Not applicable.	Risks from potential groundwater ingestion reduced within 3 to 6 months due to institutional controls.	Thirty years used to determine NPW costs. Time for completion of remediation is unknown.	Thirty years used to determine NPW costs. Time for completion of remediation is unknown.	Thirty years used to determine NPW costs. Time for completion of remediation is unknown.	Thirty years used to determine NPW costs. Time for completion of remediation is unknown.
IMPLEMENTABILITY						
• Ability to Construct and Operate	No construction or operation activities.	No construction or operation activities.	Installation and treatment technologies proven.	Installation and treatment technologies proven.	Installation and treatment technologies proven.	Installation and treatment technologies proven.
• Ability to Monitor Effectiveness	No monitoring. Failure to detect contamination will result in potential ingestion of contaminated groundwater.	Proposed monitoring will give notice of failure before significant exposure occurs.	Adequate system monitoring.	Adequate system monitoring.	Adequate system monitoring.	Requires indirect monitoring of system performance.
• Availability of Services and Capacities; Equipment	None required.	None required.	Groundwater extraction and treatment equipment is readily available.	Groundwater extraction equipment is readily available.	Groundwater extraction equipment is readily available.	System components readily available.
COSTS Net Present Worth	$0	$350,000	$1.89 million	$1.3 million	$1.44 million	$1.32 million

RAA = Remedial Action Alternative STP = Sewage Treatment Plant ARARs = Applicable or Relevant and Appropriate Requirements

Groundwater RAAs provide protection of human health and the environment. RAA Nos. 3, 4, 5, and 6 provide protection through preventing further migration of the contaminated groundwater plume and providing treatment. It should be noted that RAAs Nos. 3, 4, 5, and 6 may result in complete restoration of the plume over time; however, remediation will continue for many years.

Compliance with ARARs

Site-specific ARARs are summarized on Tables 6 and 7 (contaminant-specific), Table 8 (location-specific), and Table 9 (action-specific). RAA Nos. 1 and 2 will potentially exceed federal and state ARARs associated with the contaminants remaining in groundwater. RAA Nos. 3, 4, and 5 will potentially meet all of their respective ARARs for the treated effluent. In time, RAA Nos. 3, 4, 5, and 6 will meet the groundwater remediation objectives.

Long-Term Effectiveness and Permanence

RAA No. 1 will not reduce potential risks due to exposure to contaminated groundwater. Risks will be reduced under RAA Nos. 2 through 6 through the implementation of the institutional controls and/or treatment. Enforcing potable water supply well restrictions is effective in eliminating direct exposure to groundwater. RAAs 3 through 6 will provide additional long-term effectiveness and permanence because they use a form of treatment to reduce the potential hazards posed by the COC present in the groundwater aquifer.

All of the RAAs will require a 5-year review.

Reduction of Toxicity, Mobility, or Volume Through Treatment

No form of treatment is included under RAA Nos. 1 and 2. RAA Nos. 1 and 2 do not satisfy the statutory preference for treatment, whereas the other RAAs do satisfy the preference. All of the "treatment" RAAs (RAA Nos. 3 through 6) will provide reduction of toxicity, mobility and/or volume of contaminants in the groundwater aquifers.

Short-Term Effectiveness

Risks to community and workers are not increased with the implementation of RAA Nos. 1 and 2. Current impacts, which are negligible from existing conditions will continue under

TABLE 6
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED CONTAMINANT-SPECIFIC CRITERIA RECORD OF DECISION OPERABLE UNIT NO. 5 (SITE 2) MCB CAMP LEJEUNE, NORTH CAROLINA

ARAR Citation	Requirement	Consideration in the FS
FEDERAL/CONTAMINANT-SPECIFIC		
Safe Drinking Water Act a. Maximum Contaminant Levels (MCLs) 40 CFR 141.11-141.16 b. Maximum Contaminant Level Goals (MCLGs) 40 CFR 141.50-141.51	Standards for protection of drinking water sources serving at least 25 persons. MCLs consider health factors, as well as economic and technical feasibility of removing a contaminant; MCLGs do not consider the technical feasibility of contaminant removal. For a given contaminant, the more stringent of MCLs or MCLGs is applicable unless the MCLG is zero, in which case the MCL applies.	Relevant and appropriate in developing remediation levels for contaminated groundwater used as a potable water supply.
Reference Doses (RfDs), EPA Office of Research and Development	Presents non-enforceable toxicity data for specific chemicals for use in public health assessments to characterize risks due to exposure to contaminants.	To be considered (TBC) requirement in the public health assessment.
Carcinogenic Potency Factors, EPA Environmental Criteria and Assessment Office; EPA Carcinogen Assessment Group	Presents non-enforceable toxicity data for specific chemicals for use in public health assessments to compute the individual incremental cancer risk resulting from exposure to carcinogens.	TBC requirement in the public health assessment.
Health Advisories, EPA Office of Drinking Water	Non-enforceable guidelines for chemicals that may intermittently be encountered in public water supply systems. Available for short- or long-term exposure for a child and/or adult.	TBC requirement in the public health assessment.
National Emissions Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR Part 61)	Standards promulgated under the Clean Air Act for significant sources of hazardous pollutants, such as vinyl chloride, benzene, trichloroethylene, dichlorobenzene, asbestos, and other hazardous substances. Considered for any source that has the potential to emit 10 tons of any hazardous air pollutant or 25 tons of a combination of hazardous air pollutants per year.	Remedial actions (e.g., air stripping) may result in release of hazardous air pollutants. The treatment design may elect to control equipment air emissions using the same or similar methods.

TABLE 6 (Continued)
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED CONTAMINANT-SPECIFIC CRITERIA
RECORD OF DECISION
OPERABLE UNIT NO. 5 (SITE 2)
MCB CAMP LEJEUNE, NORTH CAROLINA

ARAR Citation	Requirement	Consideration in the FS
National Ambient Air Quality Standards (40 CFR 50)	Standards for the following six criteria pollutants: particulate matter; sulfur dioxide; carbon monoxide; ozone; nitrogen dioxide; and lead. The attainment and maintenance of these standards are required to protect the public health and welfare.	Relevant and appropriate requirements for remedial actions requiring discharge to the atmosphere.
EPA Ambient Water Quality Criteria (Section 304(a)(1) of CWA)	Non-enforceable criterion for water quality for the protection of human health from exposure to contaminants in drinking water and from ingestion of aquatic biota and for the protection of fresh-water and salt-water aquatic life.	Potentially relevant and appropriate for groundwater treatment.
STATE/CONTAMINANT-SPECIFIC		
State of North Carolina Department of Environment, Health, and Natural Resources Division of Environmental Management 15A NCAC 2B.0200 - Classifications and Water Quality Standards Applicable to Surface Waters of North Carolina	Surface water quality standards based on water use and criteria class of surface water.	Relevant and appropriate for remedial actions requiring discharge to surface water.
North Carolina Anti-Degradation Policy for Surface Water (Water Quality Standards Title 15A, Chapter 2, Subchapter 2B)	Provides for an anti-degradation policy for surface water quality. Pursuant to this policy, the requirements of 40 CFR 131.12 are adopted by reference in accordance with General Statute 150B-14(b).	This policy is a TBC requirement for remedial actions requiring discharge to surface water.
North Carolina Groundwater Standards Applicable Statewide	Establishes maximum contaminant concentrations to protect groundwater. These standards are mandatory.	Potentially relevant and appropriate for remedial actions requiring discharge to groundwater.

TABLE 6 (Continued)
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED CONTAMINANT-SPECIFIC CRITERIA
RECORD OF DECISION
OPERABLE UNIT NO. 5 (SITE 2)
MCB CAMP LEJEUNE, NORTH CAROLINA

ARAR Citation	Requirement	Consideration in the FS
North Carolina DEHNR Regulations	Standards for protection of health of consumers using public drinking water supplies. Establishes MCLs for given contaminants.	Potentially relevant and appropriate in developing remediation goals for contaminated groundwater used as a potable water supply.
North Carolina DEHNR Toxic Air Pollutant Rule Statutory Authority G.S. 143-215.107(a)(1),(3),(4),(5); 143-B-282	A facility shall not emit any toxic air pollutants (as listed in Rule .1104) that may cause or contribute beyond the premises (contiguous property boundary) to any significant ambient air concentration that may adversely affect human health.	Potentially relevant and appropriate for remedial actions requiring discharge to the atmosphere.
North Carolina DEHNR Regulations for Hazardous (15A NCAC 13A) and Solid Waste (15A NCAC 13B)	Standards and requirements for management and disposal of hazardous and solid waste.	Potentially relevant and appropriate for remedial actions requiring management and disposal of hazardous and/or solid waste.

TABLE 7

CONTAMINANT-SPECIFIC ARARs AND TO BE CONSIDERED CRITERIA
RECORD OF DECISION
OPERABLE UNIT NO. 5 (SITE 2)
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Groundwater Contaminant of Concern	MCL (1) (µg/L)	NCWQS (2) (µg/L)	Federal Health Advisories (3) (µg/L)	
			For a 10 kg Child Longer Term	For a 70 kg Adult Lifetime
Acenaphthene	--	--	--	--
Arsenic	50	50	--	2(4)
Barium	2,000	2,000	--	200
Beryllium	--	4	400	0.8(4)
4,4'-DDD	--	--	--	--
4,4'-DDT	--	--	--	--
2,4-Dimethylphenol	--	--	--	--
Ethylbenzene	700	29	1,000	700
Lead	15	15	--	--
2-Methylnaphthalene	--	--	--	--
Naphthalene	--	--	400	20
Phenol	--	--	6,000	400
Trichloroethene	5	2.8	--	300(4)
Vanadium	--	--	--	--
Xylene (total)	10,000	530	40,000	10,000

Notes: (1) MCL = Safe Drinking Water Act Maximum Contaminant Level (MCL for lead is an Action Level)
(2) NCWQS = North Carolina Water Quality Standards for Class GA groundwater
(3) Health Advisories - to be considered criteria
(4) Level at 1E-4 cancer risk

-- No ARAR available or established

TABLE 8

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
AND TO BE CONSIDERED LOCATION-SPECIFIC CRITERIA
RECORD OF DECISION
OPERABLE UNIT NO. 5 (SITE 2)
MCB CAMP LEJEUNE, NORTH CAROLINA

ARAR Citation	Requirement	Consideration in the FS
FEDERAL AND STATE/ LOCATION-SPECIFIC		
National Historic Preservation Act of 1966 16 USC 470, 40 CFR 6.301(b), and 36 CFR 800	Requires action to take into account effects on properties included in or eligible for the National Register of Historic Places and to minimize harm to National Historic Landmarks.	No known historic properties are within or near OU No. 5, therefore, this act will not be considered as an ARAR.
Archeological and Historic Preservation Act 16 USC 469 and 40 CFR 6.301(c)	Establishes procedures to provide for preservation of historical and archeological data which might be destroyed through alteration of terrain.	No known historical or archeological data is known to be present at the site, therefore, this act will not be considered as an ARAR.
Historic Sites, Buildings and Antiquities Act 16 USC 461467 and 40 CFR 6.301(a)	Requires action to avoid undesirable impacts on landmarks on the National Registry of Natural Landmarks.	No known historic sites, buildings or antiquities are within or near OU No. 5, therefore, this act will not be considered as an ARAR.
Fish and Wildlife Coordination Act 16 USC 661-666	Requires action to protect fish and wildlife from actions modifying streams or areas affecting streams.	Overs Creek and the drainage ditch adjacent to the railroad tracks are located near and within the operable unit boundaries, respectively. If remedial actions are implemented that modify this creek or drainage channel, this will be an applicable ARAR.
Federal Endangered Species Act 16 USC 1531, 50 CFR 200, and 50 CFR 402	Requires action to avoid jeopardizing the continued existence of listed endangered species or modification of their habitat.	Many protected species have been cited near and on MCB Camp Lejeune such as the American alligator, the Bachmans sparrow, the Black skimmer, the Green turtle, the Loggerhead turtle, the piping plover, the Red-cockaded woodpecker, and the rough-leaf loosestrife (LeBlond, 1991), (Fussell, 1991), (Walters, 1991). Therefore, this will be considered as an ARAR.

TABLE 8 (Continued)

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
AND TO BE CONSIDERED LOCATION-SPECIFIC CRITERIA
RECORD OF DECISION
OPERABLE UNIT NO. 5 (SITE 2)
MCB CAMP LEJEUNE, NORTH CAROLINA

ARAR Citation	Requirement	Consideration in the FS
North Carolina Endangered Species Act GS 113-331 to 113-337	*Per the North Carolina Wildlife Resources* Commission. Similar to the Federal Endangered Species Act, but also includes State special concern species, State significantly rare species, and the State watch list.	*Since the American alligator has been* sighted in nearby surface water features, this will be considered as an ARAR.
Rivers and Harbors Act of 1899 (Section 10 Permit) 33 USC 403	Requires permit for structures or work in or affecting navigable waters.	No remedial actions will affect the navigable waters of the New River. Therefore, this act will not be considered as an ARAR.
Executive Order 11990 on Protection of Wetlands Executive Order Number 11990 and 40 CFR 6	Establishes special requirements for Federal agencies to avoid the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practicable alternative exists.	Based on a review of Wetland Inventory Maps, the lower reaches of Overs Creek has areas of wetlands. Therefore, this will be an applicable ARAR.
Executive Order 11988 on Floodplain Management Executive Order Number 11988, and 40 CFR 6	Establishes special requirements for Federal agencies to evaluate the adverse impacts associated with direct and indirect development of a floodplain.	Based on the Federal Emergency Management Agency's Flood Insurance Rate Map for Onslow County, the site is primarily within a minimal flooding zone (outside the 500-year floodplain). The creek is within the 100-year floodplain (FEMA, 1987). Therefore, this may be an ARAR for the operable unit.
Wilderness Act 16 USC 1131 and 50 CFR 35.1	Requires that federally owned wilderness area are not impacted. Establishes nondegradation, maximum restoration, and protection of wilderness areas as primary management principles.	No known federally owned wilderness areas near the operable unit exist, therefore, this act will not be considered as an ARAR.
National Wildlife Refuge System 16 USC 668, and 50 CFR 27	Restricts activities within a National Wildlife Refuge.	No known National Wildlife Refuge areas near the operable unit exist, therefore, this will not be considered as an ARAR.

TABLE 8 (Continued)

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
AND TO BE CONSIDERED LOCATION-SPECIFIC CRITERIA
RECORD OF DECISION
OPERABLE UNIT NO. 5 (SITE 2)
MCB CAMP LEJEUNE, NORTH CAROLINA

ARAR Citation	Requirement	Consideration in the FS
Scenic Rivers Act 16 USC 1271, and 40 CFR 6.302(e)	Requires action to avoid adverse effects on designated wild or scenic rivers.	No known wild or scenic rivers near the operable unit exist, therefore, this act will not be considered as an ARAR.
Coastal Zone Management Act 16 USC 1451	Requires activities affecting land or water uses in a coastal zone to certify noninterference with coastal zone management.	No activities will affect land or water uses in a coastal zone, therefore, this act will not be considered as an ARAR.
Clean Water Act (Section 404) 33 USC 404	Prohibits discharge of dredged or fill material into wetland without a permit.	No actions to discharge dredged or fill material into wetlands will be considered for the operable unit, therefore, this act will not be considered as an ARAR.
RCRA Location Requirements 40 CFR 264.18	Limitations on where on-site storage, treatment, or disposal of RCRA hazardous waste may occur.	These requirements may be applicable if the remedial actions for the operable unit includes the on-site storage, treatment, or disposal of RCRA hazardous waste. Therefore, these requirements may be an applicable ARAR for the operable unit.

TABLE 9

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED ACTION-SPECIFIC CRITERIA
RECORD OF DECISION
OPERABLE UNIT NO. 5 (SITE 2)
MCB CAMP LEJEUNE, NORTH CAROLINA

ARAR Citation	Requirement	Consideration in the FS
FEDERAL AND STATE/ACTION-SPECIFIC		
OSHA Requirements (29 CFR Parts 1910, 1926, and 1904)	Regulations provide occupational safety and health requirements applicable to workers engaged in on-site field activities.	Required for site workers during construction and operation of remedial activities. Applicable to all actions at the site.
DOT Rules for Hazardous Materials Transportation (49 CFR Parts 107 and 171.1-500)	Regulates the transport of hazardous waste materials including packaging, shipping, and placarding.	Remedial actions may include off-site treatment and disposal of contaminated groundwater. Applicable for any action requiring off-site transportation of hazardous materials.
Resource Conservation and Recovery Act (RCRA) Subtitle C		
Identification and Listing of Hazardous Waste (40 CFR Part 261)	Regulations concerning determination of whether or not a waste is hazardous based on characteristics or listing.	Primary site contaminants are not considered to be listed wastes. However, contaminated media may be considered hazardous by characteristic.
Treatment, Storage, and Disposal of Hazardous Waste (40 CFR Parts 262-265, and 266)	Regulates the treatment, storage, and disposal of hazardous waste.	During remediation, treatment, storage, and disposal activities may occur. Materials may be classified as hazardous wastes.
RCRA Subtitle D	Regulates the treatment, storage, and disposal of solid waste and materials designated by the State as special waste.	Applicable to remedial actions involving treatment, storage, or disposal of materials classified as solid and/or special waste.

TABLE 9 (Continued)

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
AND TO BE CONSIDERED ACTION-SPECIFIC CRITERIA
RECORD OF DECISION
OPERABLE UNIT NO. 5 (SITE 2)
MCB CAMP LEJEUNE, NORTH CAROLINA

ARAR Citation	Requirement	Consideration in the FS
RCRA Land Disposal Restrictions (LDRs) Requirements (40 CFR Part 268)	Restricts certain listed or characteristic hazardous waste from placement or disposal on land (includes injection wells) without treatment. Provides treatment standards and Best Demonstrated Available Technology (BAT).	LDRs may prohibit or govern the implementation of certain remedial alternatives. Extraction and treatment and/or movement of RCRA hazardous waste may trigger LDR requirements for the waste. Reinjection of treated groundwater into or above an underground source of drinking water may be exempt from LDRs given the treatment of the groundwater meets exemption requirements.
Control of Air Emissions from Superfund Air Strippers at Superfund Ground Water Sites (OSWER Directive 9355.0-28)	Guidance that establishes criteria as to whether air emission controls are necessary for air strippers. A maximum 3 lbs/hr or 15 lbs/day or 10 tons/yr of VOC emissions is allowable; air pollution controls are recommended for any emissions in excess of these quantities.	To be considered (TBC) as remedial action may include air stripping.
General Pretreatment Regulations for Existing and New Sources of Pollutants (40 CFR Part 403)	Regulations promulgated under the Clean Water Act. Includes provisions for effluent discharge to Publicly Owned Treatment Works (POTW). Discharge of pollutants that pass through or interfere with the POTW, contaminate sludge, or endanger health/safety of POTW workers is prohibited. These regulations should be used in conjunction with local POTW pretreatment program requirements.	Applicable for remedial actions involving discharge to a sanitary sewer.

TABLE 9 (Continued)

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
AND TO BE CONSIDERED ACTION-SPECIFIC CRITERIA
RECORD OF DECISION
OPERABLE UNIT NO. 5 (SITE 2)
MCB CAMP LEJEUNE, NORTH CAROLINA

ARAR Citation	Requirement	Consideration in the FS
North Carolina Water Pollution Control Regulations (Title 15, Chapter 2, Section .0100)	Regulates point-source discharges through the North Carolina permitting program. Permit requirements include compliance with corresponding water quality standards, establishment of a discharge monitoring system, and completion of regular discharge monitoring records.	May be applicable for actions requiring discharge to the ditches on site. The base currently has a North Carolina permit for surface water discharge to the ditch to the north of the site. This permit may need to be modified.
Protection of Archaeological Resources (32 CFR Parts 229 and 229.4; 43 CFR Parts 107 and 171.1-5)	Develops procedures for the protection of archaeological resources.	Applicable to any excavation on site. If archaeological resources are encountered during soil excavation, they must be reviewed by Federal and State archaeologists.
North Carolina Sedimentation Pollution Control Act of 1973 (Chapter 113A)	Regulates stormwater management and erosion/ sedimentation control practices that must be followed during land disturbing activities.	Applicable for remedial actions involving land disturbing activities (i.e., excavation of soil and sediment).

these two RAAs. Under RAA Nos. 3, 4, 5, and 6, risks to the community and workers will be slightly increased due to a temporary increase in dust production and volatilization during the installation of the piping for the groundwater treatment system or piping system (during treatment operations for the workers). In addition, aquifer drawdown will occur under RAA Nos. 3, 4, and 5. This drawdown, however, should not result in any significant environmental effects.

Implementability

No construction, operation, or administrative activities are associated with RAA No. 1. There are no construction or operation activities associated with RAA No. 2 other than groundwater sampling, which is easily performed. RAA No. 3 will require operation of a groundwater pump and treatment system. RAA Nos. 4 and 5 will require operation of a groundwater extraction system only. RAA No. 6 will require operation of an in situ treatment system.

Cost

Costs for RAAs 1 through 6 are summarized below.

	Remedial Action Alternatives					
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Capital Costs	$0	$0	$303,000	$210,000	$323,000	$124,000
O&M Costs						
Years 1 & 2	$0	$57,100	$162,760	$106,220	$108,220	$113,440
Years 3-5	$0	$28,550	$134,210	$77,670	$79,670	$84,890
Years 6-30	$0	$15,475	$119,935	$63,395	$65,395	$70,615
Present Worth	$0	$350,000	$1,890,000	$1,300,000	$1,440,000	$1,320,000

9.0 SELECTED REMEDY

This section of the ROD focuses on the selected remedy for Site 2. The major treatment components, engineering controls, and institutional controls of the remedy will be discussed along with the estimated costs to implement the remedial action. In addition, the remediation objectives to be attained at the conclusion of the remedial action will be discussed.

Remedy Description

The selected remedy for Site 2 is RAA No. 2, Institutional Controls/Long-Term Groundwater Monitoring. The major components of the selected remedy include:

- Implementing a long-term groundwater monitoring program to monitor on-site wells and nearby potable water supply wells. Under this program, groundwater from 12 existing monitoring wells and 3 nearby operational water supply wells will be collected and analyzed for the following parameters:

  - VOCs
  - Barium (total and filtered)
  - Beryllium (total and filtered)
  - Cadmium (total and filtered)
  - Chromium (total and filtered)
  - Lead (total and filtered)
  - Manganese (total and filtered)
  - Total suspended solids
  - Total dissolved solids

- Restricting the installation of new potable water supply wells in the vicinity of Site 2.

Estimated Costs

The estimated capital cost associated with the selected remedy is $0. Annual O&M costs of approximately $57,100 are projected for administration of institutional controls and the quarterly sampling of the monitoring wells and supply wells for years 1 and 2. Approximately $28,550 are projected for the semiannual sampling in years 3 through 5 and $15,475 for the annual sampling in years 6 through 30. This annual cost is for 30 years. Assuming an annual percentage rate of 5 percent, these costs equate to a NPW of approximately $350,000. Table 10 presents a summary of this cost estimate for the major components of the selected remedy.

Remediation Goals

Based on the results of the RI/FS and all other available site information, the selected remedy is expected to meet the remediation objective of reducing the risk to human health due to groundwater exposure. This will be accomplished by conducting long-term groundwater monitoring to insure that there is no exposure to human health due to potential off-site

TABLE 10
DETAILED COSTING EVALUATION

OPERABLE UNIT NO. 5, SITE 2 RECORD OF DECISION
GROUNDWATER REMEDIAL ACTION ALTERNATIVE NO. 2
LIMITED ACTION

O & M COST ESTIMATE 16-Jun-94

COST COMPONENT	UNIT	QUANTITY	UNIT COST	SUBTOTAL COST	TOTAL COST	BASIS OR COMMENTS	SOURCE
Groundwater Monitoring - Years 1 - 2						15 wells sampled quarterly.	
Labor	Hours	360	$35	$12,600		15 wells x 2 samplers x 3 hrs/well x 4 events	Engineering estimate
Lab. Analysis - TCL VOA/Metals	Sample	60	$375	$22,500		15 samples; quarterly	Basic Ordering Agreement
Misc. Expenses	Sample Event	4	$2,500	$10,000		Incl. travel, lodging, supplies,- 2 people	Engineering estimate
Reporting	Sample Event	4	$3,000	$12,000		1 report per sampling event	Engineering estimate
Groundwater Monitoring - Years 3 - 5						15 wells sampled semiannually.	
Labor	Hours	180	$35	$6,300		15 wells x 2 samplers x 3 hrs/well x 2 events	Engineering estimate
Lab. Analysis - TCL VOA/Metals	Sample	30	$375	$11,250		15 samples; semiannually	Basic Ordering Agreement
Misc. Expenses	Sample Event	2	$2,500	$5,000		Incl. travel, lodging, supplies,- 2 people	Engineering estimate
Reporting	Sample Event	2	$3,000	$6,000		1 report per sampling event	Engineering estimate
Groundwater Monitoring Years 6 - 30						15 wells sampled annually.	
Labor	Hours	90	$40	$3,600		15 wells x 2 samplers x 3 hrs/well x 1 event	Engineering estimate
Lab. Analysis - TCL VOA/Metals	Sample	15	$375	$5,625		15 samples; annually	Basic Ordering Agreement
Misc. Expenses	Sample Event	1	$2,750	$2,750		Incl. travel, lodging, supplies,- 2 people	Engineering estimate
Reporting	Sample Event	1	$3,500	$3,500		1 report per sampling event	Engineering estimate
Total Annual O&M Costs, Years 1 - 2					$57,100	For years 1 and 2	
Total Annual O&M Costs, Years 3 - 5					$28,550	For years 3 through 5	
Total Annual O&M Costs, Years 6 - 30					$15,475	For years 6 through 30	
Approximate Present Worth Value					$350,000		

migration of groundwater contaminants. In addition, restrictions on the installation of new potable water supply wells in the vicinity of Site 2 will prevent potential human health exposure.

USEPA/State Acceptance

USEPA Region IV and the NC DEHNR have reviewed the Proposed Remedial Action Plan (PRAP) for Operable Unit 5. Both agencies are in agreement with the selected remedy (RAA No. 2, Institutional Controls/Long-Term Groundwater Monitoring) outlined in this ROD.

Because North Carolina groundwater standards (15A NCAC 2L.0106) for ethylbenzene, xylene, and total metals (barium, beryllium, cadmium, chromium, lead, and manganese) were exceeded in shallow monitoring wells, a Corrective Action Plan will be submitted (under separate cover) to the NC DEHNR in accordance with 15A NCAC 2L.0106(k) and (l).

Community Acceptance

The selected remedy (RAA No.2, Institutional Controls/Long-Term Groundwater Monitoring) was presented to the community during the public comment period and during the public meeting (refer to Section 3.0 - Highlights of Community Participation). The limited number of Community comments, and the nature of these comments (refer to Section 11.0 - Responsiveness Summary) indicate that the selected remedy has achieved community acceptance.

10.0 STATUTORY DETERMINATIONS

A selected remedy must satisfy the statutory requirements of CERCLA Section 121 which include:

- Be protective of human health and the environment.
- Comply with ARARs.
- Be cost-effective.

- Utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

- Satisfy the preference for treatment that reduces toxicity, mobility, or volume as a principal element, or provide an explanation as to why this preference is not satisfied.

The evaluation of how the selected remedy for Site 2 satisfies these requirements is presented below.

Protection of Human Health and the Environment

The selected remedy provides protection to human health and the environment through groundwater monitoring (to insure there is no off site migration of groundwater contaminants) and restriction on construction of new potable water supply wells. These restrictions, if carefully enforced, prevent groundwater ingestion and exposure, thereby satisfying the requirement to be protective of human health and the environment.

Compliance With Applicable or Relevant and Appropriate Requirements

The selected remedy will not immediately meet the federal and North Carolina groundwater standards, although long-term achievement of these standards is possible through natural biodegradation processes. Institutional controls are sufficient to protect human health and the environment and, therefore, compliance with chemical-specific ARARs may be impractical. Due to the isolated nature of the contaminated groundwater, the selected remedy will insure, through the long-term groundwater monitoring program, that no off-site migration of groundwater contaminants occurs. The selected remedy meets location-specific and action-specific ARARs.

There are a number of site-specific factors which contribute to the effectiveness/ appropriateness of the selected remedy. These factors, which support the decision to not cleanup the groundwater, include the following:

- There are no sources of groundwater contamination or free product remaining on the site.

- Organic contaminants which exceed the North Carolina groundwater standards (ethylbenzene and total xylenes) have the capacity to degrade and/or attenuate naturally under site-specific conditions. These contaminants have only been detected in concentrations exceeding the North Carolina groundwater standards in monitoring well 2GW3. Detected concentrations of ethylbenzene and total xylenes in monitoring well 2GW3 have decreased steadily over time (Figures 4 and 5). In addition, contamination is limited to the shallow aquifer, which is not utilized as a source of drinking water.

- Inorganics were detected in groundwater samples collected from shallow monitoring wells at the site. Several of these analytes, based on total metals analysis, exceeded federal and/or North Carolina groundwater quality standards. The distribution of detected inorganics in shallow groundwater followed no discernible pattern that would indicate a likely source. Many of the highest concentrations of inorganics were detected in background monitoring wells 2GW9 and 2GW8. The concentrations of detected inorganics is much greater in the unfiltered (total) samples than in the filtered (dissolved) samples. This indicates that the inorganics detected in groundwater samples at Site 2 may be due predominantly to the presence of soil particles entrained in the groundwater samples and may not be attributable to site operations. Some inorganics (arsenic, lead, barium, beryllium, and vanadium) were nonetheless retained as chemicals of concern in the baseline risk assessment.

- The existing groundwater monitoring network (12 monitoring wells) completely encircles the site. The selected remedy includes long-term monitoring of groundwater quality through collection of groundwater samples from these monitoring wells.

- The groundwater monitoring network can be utilized to predict time and direction of groundwater contaminant travel with reasonable certainty.

- The groundwater monitoring network will be utilized to ensure that groundwater contaminant migration will not result in any violation of applicable groundwater standards at any existing or foreseeable receptor.

- The groundwater monitoring network will be utilized to ensure that groundwater contaminants have not and will not migrate onto adjacent properties.

FIGURE 4
MON WELL 2GW3 HISTORICAL DATA

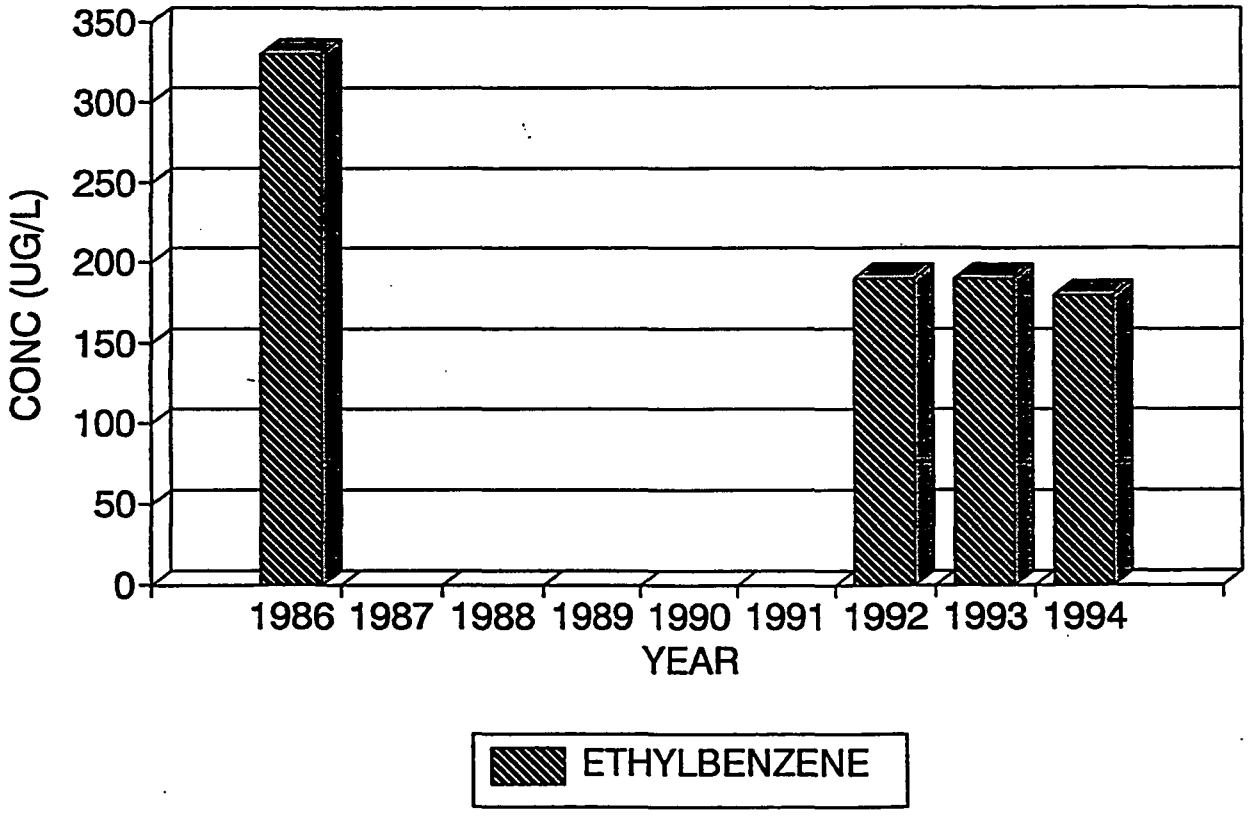
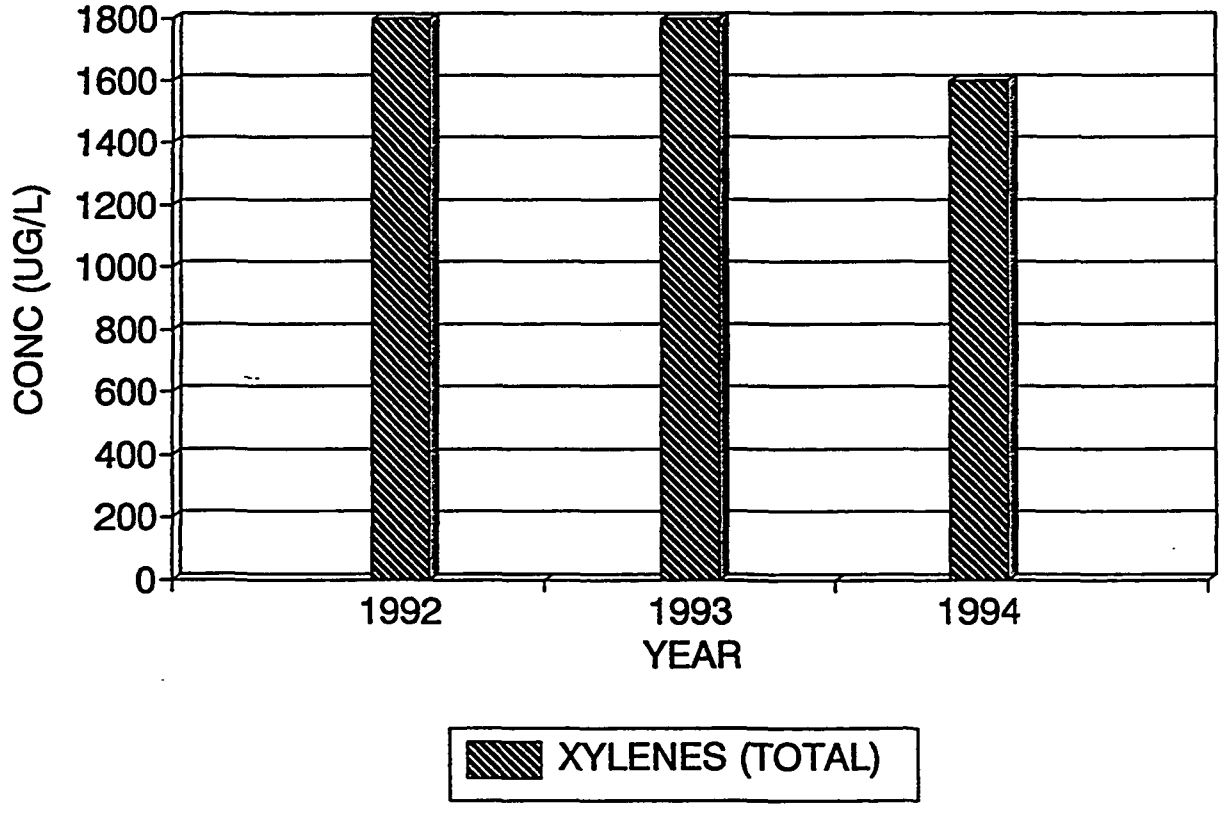


FIGURE 5
MON WELL 2GW3 HISTORICAL DATA



- The groundwater monitoring network will be utilized to ensure that groundwater contaminants will not discharge to surface waters in violation of applicable surface water standards.

- The long-term groundwater monitoring program included in the selected remedy will sufficiently track the degradation and attenuation of contaminants and contaminant byproducts within and downgradient of the plume and to detect contaminants and contaminant byproducts prior to their reaching any existing one year's time of travel upgradient of the receptor and no greater than the distance the groundwater at the contaminated site is predicted to travel in five years.

Cost Effectiveness

The selected remedy is highly cost-effective because it provides adequate protection of human health and the environment at a relatively low cost. The only RAA that incurs less cost is the No Action RAA, which may not be effective at protecting human health and the environment.

Utilization of Permanent Solutions and Alternative Treatment Technologies

The selected remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. Restricting the installation of additional potable supply wells is a permanent solution to potential groundwater exposure, if carefully enforced. Due to the isolated nature of the contaminated groundwater and the lack of evidence of a contaminant source, use of alternative treatment technologies was deemed impracticable from an engineering and administrative standpoint.

Preference for Treatment as a Principal Element

The selected remedy does not satisfy the statutory preference for treatment as a principal element. Due to the isolated nature of the contaminated groundwater, the limited extent of contamination, and the minimal risks to the community and workers, use of treatment was deemed impracticable.

11.0 RESPONSIVENESS SUMMARY

The selected remedy for Operable Unit 5 is RAA No. 2 - Institutional Controls/Long-Term Groundwater Monitoring. Based on written comments received during the public comment period and the comments received from the audience at the public meeting of July 27, 1994, the public appears to support the preferred alternative. In addition, the EPA Region IV and the NC DEHNR are in support of the preferred alternative. Members of the community who attended the public meeting on July 27, 1994, did not appear to have any opposition to the preferred alternative.

11.1 Background On Community Involvement

A record review of the MCB Camp Lejeune files indicates that the community involvement centers mainly on a social nature, including the community outreach programs and base/community clubs. The file search did not locate written Installation Restoration Program concerns of the community. A review of historic newspaper articles indicated that the community is interested in the local drinking and groundwater quality, as well as that of the New River, but that there are no expressed interests or concerns specific to the environmental sites (including Site 2). Two local environmental groups, the Stump Sound Environmental Advocates and the Southeastern Watermen's Association, have posed questions to the base and local officials in the past regarding other environmental issues. These groups were sought as interview participants prior to the development of the Camp Lejeune, Community Relations Plan. Neither group was available for the interviews.

Community relations activities to date are summarized below:

- Conducted additional community relations interviews, February through March 1990. A total of 41 interviews were conducted with a wide range of persons including base personnel, residents, local officials, and off-base residents.

- Prepared a Community Relations Plan, September 1990.

- Conducted additional community relations interviews, August 1993. Nineteen persons were interviewed, representing local business, civic groups, on- and off-base residents, military and civilian interests.

- Prepared a revised Preliminary Draft Community Relations Plan, August 1993.

- Established two information repositories.

- Established the Administrative Record for all of the sites at the base.

- Released PRAP for public review in repositories, July 1994.

- Released public notice announcing public comment and document availability of the PRAP, July 21-27, 1994.

- Held Technical Review Committee meeting, July 26, 1994, to review PRAP and solicit comments.

- Held public meeting on July 27, 1994, to solicit comments and provide information. Approximately 10 people attended. The public meeting transcript is available in the repositories. A copy of the transcript is included in Appendix A of this ROD.

11.2 Summary of Comments Received During the Public Comment Period and Agency Responses

11.2.1 Written Comments

A letter commenting on the selected remedy was submitted by the NC DEHNR during the public comment period. This letter was dated August 18, 1994, and included comments on two general points:

- NC DEHNR Superfund section is in agreement with the selected remedy.

- As the selected remedy does not actively remediate the ethylbenzene and xylene detected in monitoring well 2GW3, a Corrective Action Plan is to be submitted in accordance with North Carolina groundwater regulations (15A NCAC 2L.0106).

Navy/Marine Corps Response: A Corrective Action Plan will be submitted (under separate cover) to the NC DEHNR in accordance with 15A NCAC 2L.0106(k) and (l).

11.2.2 Public Meeting Comments

Several questions/comments were generated at the July 27, 1994, public meeting. The public meeting was held to discuss the Department of the Navy/Marine Corps' preferred alternative. A few of the questions pertained to matters that are not specifically related to the preferred alternative (e.g., some members of the audience inquired as to the history of site operations). These types of questions and answers will not be addressed as part of this Responsiveness Summary; however, specific answers to these questions are documented in the transcript to the public meeting which is contained in Appendix A. The transcript has also been included in the Administrative Record. A summary of comments pertaining to the proposed alternatives and site investigations is given below.

Water Supply Wells

1. One member of the audience at the public meeting inquired as to the proximity of water supply wells to Site 2.

   Navy/Marine Corps Response: There are three operating water supply wells in the vicinity of Site 2. These are:

   Well 616 - 1,900 feet southeast of Site 2
   Well 646 - 1,200 feet northwest of Site 2
   Well 647 - 1,300 feet east of Site 2

   Each of these supply wells will be sampled with the on-site monitoring wells during the long-term groundwater monitoring.

Remediation

1. One member of the audience inquired as to the location of the incinerator for the excavated pesticide - contaminated soil and the identity of the remediation contractor.

   Navy/Marine Corps Response: The excavated pesticide - contaminated soil is transported to an incinerator in Kentucky for treatment and disposal. The remediation contractor is OHM Remediation Services Corporation of Findlay, Ohio, which is responsible for all subcontracts required to execute the remediation.

2. One member of the audience inquired as to the duration of the selected remedy.

Navy/Marine Corps Response: The long-term groundwater monitoring may be conducted over a 30-year period. In accordance with CERCLA requirements, the selected alternative will be reviewed every five years.

Appendix A
Transcript: Public Meeting, July 27, 1994

PUBLIC HEARING

ON THE

PROPOSED CLEANUP PLAN FOR OPERABLE UNITS ONE AND FIVE

SITES 21, 24, AND 78

JULY 27, 1994

HELD AT
TARAWA TERRACE ELEMENTARY SCHOOL
CORBIN STREET
JACKSONVILLE, NORTH CAROLINA

REPORTED BY: STACY TONE, CCR

CAPE FEAR COURT REPORTING
P.O. BOX 1256
WILMINGTON, NORTH CAROLINA 28402

(910) 763-0576

A P P E A R A N C E S

PRESENTED BY:

MR. RAYMOND WATTRAS and
MR. TOM BIXIE
BAKER ENVIRONMENTAL, INC.
AIRPORT OFFICE PARK, BUILDING 3
420 ROUSER ROAD
CORAOPOLIS, PENNSYLVANIA 15108
(412) 269-6000

PROCEEDINGS 7:18 P.M.

MR. PAUL: GOOD EVENING. TONIGHT WE'RE GOING TO DISCUSS THE PROPOSED REMEDIAL ACTION PLANS FOR OPERABLE UNIT ONE AND FIVE, NOT TEN WE DISCUSSED THAT LAST NIGHT. THE PUBLIC COMMENT PERIOD WILL BEGIN TODAY, JULY 27TH, AND EXTEND THROUGH AUGUST 27TH OF 1994. I WILL SAVE INTRODUCTIONS TONIGHT BECAUSE YOU GUYS WERE HERE LAST NIGHT AND KNOW PROBABLY WHO EVERYONE IS AND I'LL TURN IT OVER NOW TO MR. RAY WATTRAS FROM BAKER.

MR. WATTRAS: THANK YOU. PRETTY MUCH THE SAME FORMAT AS LAST NIGHT. FEEL FREE TO INTERRUPT ME AT ANY TIME TO DISCUSS SOMETHING THAT MIGHT NOT BE CLEAR AND WE'LL GO FROM THERE; A PRETTY CASUAL FORMAT HERE.

WE'RE FIRST GOING TO BE TALKING ABOUT OPERABLE UNIT NUMBER ONE. THIS OPERABLE UNIT CONSISTS OF THREE SITES. THE MOST NOTABLE SITE MIGHT BE SITE 78, THE HADNOT POINT INDUSTRIAL AREA. IT'S THE MAIN PART OF CAMP LEJEUNE, ONE OF THE FIRST PORTIONS OF THE BASE THAT WAS CONSTRUCTED.

THE OTHER TWO SITES -- SITE 21 IS ACTUALLY LOCATED WITHIN THE BOUNDARY OF HADNOT POINT. IT'S A TRANSFORMER STORAGE LOT. AND SITE 24 IS KNOWN AS THE INDUSTRIAL AREA FLY ASH DUMP. IT'S LOCATED RIGHT OFF OF THE HADNOT POINT AREA.

SITE 21 IS THE SMALLEST OF THE SITES. IT'S ROUGHLY TEN ACRES IN SIZE. THE HISTORY OF THAT SITE TELLS US THAT AT ONE TIME PART OF THIS SITE WAS USED AS A PESTICIDE HANDLING AND MIXING

AREA. AND ANOTHER PORTION OF THE SITE WAS USED TO EMPTY TRANSFORMER FLUIDS INTO IT. AND, OF COURSE, AT THAT TIME PCB'S WERE USED IN THOSE TRANSFORMERS.

THIS IS A SLIDE SHOWING THE -- THE SITE 21. THERE'S SOME BETTER PICTURES HERE. IN THIS AREA -- THIS IS THE AREA WHERE THEY DISPOSED OF THE PCB. YOU CAN TELL WHEN YOU'RE OUT THERE -- YOU CAN'T REALLY SEE THIS ON THE FIGURE, BUT WHEN YOU GO OUT THERE THERE IS A SMALL DEPRESSION IN THE GROUND SURFACE, AND THAT'S WHERE WE STARTED WITH OUR SAMPLING. WE TOOK OUR SAMPLES IN THE CENTER OF THAT PIT AND WE WORKED OUR WAY OUTWARD. THIS IS JUST ANOTHER ANGLE. AGAIN, IT'S VERY DIFFICULT TO TELL, BUT IT'S RIGHT BEHIND THIS DARK MOUND IS WHERE THIS SMALL PIT IS.

MR. PAUL: IT'S ABOUT THREE OR FOUR FEET DEEP OR?

MR. WATTRAS: NO, PROBABLY AT BEST A FOOT, I WOULD SAY, THE DEPRESSION. NOT BEING -- NO, NOT THAT NOTICEABLE. MAYBE A FOOT IN THE CENTER. YOU CAN BARELY TELL. THIS IS A PORTION OF THE SITE, AND BY THE WAY, THE SITE IS FENCED IN. AND IT IS ACTIVELY USED FOR STORAGE WITH THE EXCEPTION OF THIS DISPOSAL PIT AREA THAT PART IS OUTSIDE OF THE FENCE. BUT THIS IS THE -- WHAT WE KNOW AS THE PESTICIDE HANDLING AND MIXING AREA OF THE SITE. IT'S JUST ANOTHER VIEW OF THAT SAME AREA. A LOT OF THE LOT IS COVERED WITH GRAVEL. AS YOU CAN SEE IT'S STILL USED TO STORE DIFFERENT THINGS.

SITE 24 IS THE FLY ASH DUMP. IT'S APPROXIMATELY 100

ACRES IN SIZE. IT WAS REPORTED THAT NUMEROUS THINGS WERE TAKEN OUT THERE, INCLUDING FLY ASH, SLUDGE, SOLVENTS, CIDERS, PAINT STRIPPING COMPOUNDS AND CONSTRUCTION DEBRIS.

WE LOOKED AT FIVE AREAS WITHIN THIS 100 ACRE AREA. WE CALL THESE AREAS OF CONCERN. WE NOTED THIS AREAS USING HISTORICAL AERIAL PHOTOGRAPHS. AND ALSO WE DID A GEOPHYSICAL INVESTIGATION OUT THERE, WHICH WAS USED TO TRY TO DEFINE THE BOUNDARIES TO SEE IF THERE WAS ANY BURIED METAL OR BURIED DRUMS OR WHATEVER OUT THERE SO WE USED GEOPHYSICAL TECHNIQUES TO LOOK AT THAT. AND WE NAMED THESE AREAS THE SPIRACTOR SLUDGE DISPOSAL AREA, THE FLY ASH DISPOSAL AREA, THE BORROW AND DEBRIS DISPOSAL AREA, AND TWO BURIED METAL AREAS.

NOW, THE BURIED METAL AREAS WERE NOTED DURING THE GEOPHYSICAL INVESTIGATION WHERE WE LOOKED AT SOME ANOMALIES THAT WE THOUGHT COULD BE ASSOCIATED WITH BURIED METAL; POSSIBLY DRUMS.

THIS IS SOME OF THE FIELD ACTIVITIES AT THE SITE. THIS IS MORE OF THE -- ONE OF THE OPEN AREAS. A LOT OF THE SITES ARE HEAVILY VEGETATED. AS YOU'LL SEE IN THIS PHOTO HERE, IT'S GROWN OVER. THAT'S A PICTURE OF A MONITORING WELL IN THE MIDDLE, BUT IT'S VERY THICK IN MOST OF THE AREAS OF THE SITE.

THIS IS ANOTHER AREA. THIS IS ONE OF THE BURIED METAL AREAS THAT WE WERE LOOKING AT. ANY TIME WE DO TEST PITTING ACTIVITIES WE HAVE TO TAKE PRECAUTIONS AND DON WHAT'S CALLED LEVEL B PROTECTION WHERE OUR FIELD PEOPLE WILL ACTUALLY USE SCBA'S; SELF-CONTAINED BREATHING APPARATUSES IN CASE THEY WOULD ENCOUNTER

SOMETHING AND THEY WOULD EXPOSED TO SOMETHING.

IN THIS CASE, BY THE WAY, WE FOUND THAT WHAT WAS BURIED THERE WAS JUST CONSTRUCTION DEBRIS. SO, THE GEOPHYSICAL INVESTIGATION SAW SOMETHING IN THE SUBSURFACE; WE THOUGHT IT COULD BE DRUMS AND WE CHECKED IT OUT AND IN THIS CASE IT WAS PRETTY MUCH JUST CONSTRUCTION DEBRIS.

MRS. WOOD: WE WENT OVER THAT BECAUSE I THOUGHT WE PRETTY MUCH DISCOUNTED 24 AS NO PROBLEM, BUT YOU WENT BACK AND WENT OVER IT ANYWAY.

MR. WATTRAS: I DON'T BELIEVE -- THIS IS THE FIRST TIME WE'VE -- THERE WERE FIVE EXISTING MONITORING WELLS AT SITE 24 --

MRS. WOOD: YEAH. YEAH, THEY HAD --

MR. WATTRAS: -- THAT WERE PUT IN IN THE MID-80S AND THEY LOOKED AT GROUNDWATER ONLY. THEY NEVER LOOKED AT ANYTHING ELSE. THEY PUT IN FIVE MONITORING WELLS. AND IN THOSE FIVE MONITORING WELLS IF I RECALL THEY REALLY DIDN'T FIND ANY PROBLEMS. THEY HAD A LITTLE BIT OF ELEVATED METALS IN THE SHALLOW GROUNDWATER, BUT AS I REMEMBER THEY DID NOT HAVE ANY VOLATILE ORGANICS OR ANY OTHER TYPE OF ORGANIC COMPOUNDS. BUT THIS IS THE FIRST EXTENSIVE STUDY THAT HAS BEEN DONE AT SITE 24 WHERE WE ACTUALLY DID SOIL SAMPLING AND I'LL DISCUSS A LITTLE BIT LATER WE TOOK SOME SURFACE WATER SEDIMENT SAMPLES AND SO FORTH.

A LITTLE BIT ABOUT THE HADNOT POINT INDUSTRIAL AREA; THIS IS A HUGE AREA, AS YOU PROBABLY KNOW, IT'S ABOUT 590 ACRES.

A LOT OF MAINTENANCE SHOPS AND WAREHOUSES AND ADMINISTRATIVE BUILDINGS. WE KNOW BECAUSE OF ALL THE UNDERGROUND STORAGE TANKS, MOST OF THEM USED FOR HEATING FUEL, THAT THERE HAVE BEEN SPILLS AND LEAKS IN THE PAST.

THERE IS ANOTHER SITE, WHICH I HAVE NOT DISCUSSED YET. SITE 22 IS A FUEL FARM. THIS FUEL FARM SITS RIGHT IN THE CENTER OF THE SITE. THE TANKS HAVE BEEN REMOVED. THIS IS FLOATING PRODUCT ON THE GROUNDWATER, BUT THERE IS A -- THERE IS AN ACTIVE REMEDIATION SYSTEM THAT'S COLLECTING THIS FLOATING PRODUCT. WE ARE NOT GOING TO DISCUSS SITE 22 TONIGHT BECAUSE ACTION IS ALREADY BEING TAKEN AT THIS SITE.

MRS. WOOD: IS THAT UNDER YOUR PURVIEW OR IS THAT UNDER THE UST PROGRAM?

MR. WATTRAS: THAT IS ACTUALLY UNDER THE UST PROGRAM. EXACTLY.

MRS. WOOD: HAVE THEY CHANGED THE LEGISLATION ON THAT AT ALL? THEY DON'T DO THE PUBLIC HEARINGS. I HAVEN'T EVEN SEEN ANYTHING. THEY JUST GO AHEAD AND THAT'S THAT. IS THAT -- IS IT --

MR. WATTRAS: I DON'T KNOW HOW THAT GOES TO BE QUITE HONEST WITH YOU. I'M NOT SURE IF NEAL COULD HELP ANSWER THAT QUESTION.

MR. PAUL: THERE IS A CORRECTIVE -- WHEN YOU GO INTO A CORRECTIVE ACTION PLAN THERE IS A PUBLIC MEETING THAT YOU HAVE TO HAVE BEFORE YOU --

MRS. WOOD: ONCE YOU'RE UNDERWAY THERE SEEMS TO BE A DIFFERENT --

MR. PAUL: YOU MEAN FOR HADNOT POINT?

MRS. WOOD: WELL, NO, FOR THIS SITE 22 UNDER UST. THEY MAY HAVE THE SAME RESPONSIBILITIES.

MR. PAUL: THERE ARE SOME PUBLIC RELATIONS REQUIREMENTS AND THIS PREDATES ME. SO, I WASN'T HERE WHEN THIS SYSTEM STARTED.

MRS. WOOD: WELL, NOTHING IS MENTIONED IN THIS LETTER TO -- THAT WENT OUT TO THE EPA. AND IT WAS AN EVALUATION THAT YOU ALL -- NOT YOU PER SE --

MR. PAUL: RIGHT.

MRS. WOOD: -- BUT WHOEVER WAS HERE THEN HAD NOT INCLUDED 22 IN THIS DATA BECAUSE IF FELL UNDER THE UST PROGRAM AND THEY GOT A VERY NASTY LETTER BACK FROM THE EPA SAYING "HEY, SOME OF YOUR CONTAMINANTS ARE COMING OUT OF THIS. THEREFORE, YOU DO NOT -- YOU MUST INCLUDE IT AS PART OF THE CLEANING FACTOR GOING ON. BUT IT DID INDICATE --

MS. BERRY: SINCE THAT PREDATED HIM, THEN WE'LL TAKE A LOOK AT IT AND SEE IF THERE'S OTHER CONTAMINANTS THAT MUST BE TREATED UNDER THERE.

MRS. WOOD: I THOUGHT IT WOULD BE THERE BETWEEN THE TWO.

MS. BERRY: EXACTLY.

MRS. WOOD: IN THE MAJORITY OF THE THINGS

IN THE LIBRARY YOU JUST DON'T SEE THAT. NONE OF THAT'S UNDER YOUR PROGRAM.

MR. PAUL: WELL, WE HAVE -- I HAVE --

MRS. WOOD: NONE OF THAT'S UNDER YOUR PROGRAM.

MR. PAUL: WELL, IT IS UNDER MY PROGRAM BECAUSE I HAVE I.R. SITES AND I ALSO HAVE OTHER PROGRAM SITES. BUT IT HAS TO BE INCLUDED AS PART OF THE RECORD BECAUSE THE STATE OF NORTH CAROLINA ACTUALLY ADDRESSES THE RECORD. THEREFORE, THEY ARE CERCLA REGULATED SITES, WHERE THE STATE HAS JURISDICTION NOT EPA. SO, WE SEND THOSE GUYS QUARTERLY REPORTS, QUARTERLY REPORTS OF HOW MUCH WE PULL OUT OF THE GROUND; WATER WE'VE ACTUALLY TREATED. AND TO DATE THERE'S LIKE 25,000 GALLONS OF GASOLINE FROM THE INVENTORY RECORDS THAT WERE SHOWN TO BE MISSING. AND TO DATE WE HAVE RECOVERED ABOUT 20,000 OF GASOLINE AND WE'VE TREATED OVER 3 MILLION GALLONS OF WATER AND THAT'S BEEN SINCE OCTOBER OF '91. SO, THAT SYSTEM HAS JUST ABOUT DONE EVERYTHING YOU CAN DO. AND WE'LL PROBABLY GO BACK IN A YEAR OR TWO AND ADDRESS THE SOILS THERE, BUT THE PLUME TREATMENT IS PRETTY CLOSE TO BEING REMEDIATED. THE REST OF THE WATER IS DISSOLVING. WE'RE PROBABLY NOT GOING TO BE TAKING ANY FREE PRODUCT, WE'LL JUST BE TREATING THE CONTAMINATED GROUNDWATER. GAS HAS BEEN ACTUALLY DISSOLVED. SO IT REALLY HAS BEEN AN EFFECTIVE SYSTEM. AND IF YOU WANT TO KNOW ANYTHING ABOUT IT FEEL FREE TO GIVE WALT OR MYSELF A CALL.

MRS. WOOD: OH, I WAS --

MR. PAUL: AND THAT IS REALLY ONE OF OUR BIG SUCCESS STORIES.

MRS. WOOD: JUST TO GO ON, WHAT WOULD YOU EXPECT THE -- WHAT PERCENTAGE WOULD YOU EXPECT TO GET OUT?

MR. PAUL: WITH THE PLUME TREATMENT OPERATING FOR FREE PRODUCT?

MRS. WOOD: NO, IF YOU'VE GOT GASOLINE.

MR. PAUL: AND SOME OF THIS IS STRAIGHT FROM RICH BONNELLI, IS THAT IF YOU GET 75 PERCENT OF THE FREE PRODUCT THAT YOU THINK YOU SPILLED INTO THE GROUNDWATER THEN YOU'RE DOING A GREAT JOB, AND 20 OUT OF 25 IS ALMOST 80 PERCENT. SO, WE DONE PROBABLY AS GOOD AS WE CAN DO. AND EVEN 75 PERCENT IS A GREAT RECOVERY RATE. BUT FROM THE PEOPLE I'VE TALK TO IN THE STATE AGREE IT IS A SUCCESS.

MRS. WOOD: I'M SORRY. GO AHEAD.

MR. WATTRAS: NO, THAT'S FINE. THIS IS HADNOT POINT. CAN I ASK, HAVE YOU BEEN DOWN TO HADNOT POINT OR HAVE YOU EVER BEEN BASE?

MRS. WOOD: OH, FOR YEARS. OH, I HAVE --

MR. WATTRAS: OKAY. SO, YOU HAVE SOME IDEA OF WHAT THIS PLACE LOOKS LIKE?

MRS. WOOD: YEAH, I KNOW THIS WHOLE AREA.

MR. WATTRAS: OKAY. THESE ARE JUST RANDOM PHOTOS IT WASN'T ANYTHING PARTICULAR; JUST GOING AROUND THE HADNOT POINT AREA AND TAKING SOME PICTURES. I WILL SAY MOST OF THIS --

HADNOT POINT IS -- YOU KNOW, IT'S VERY INDUSTRIAL IN NATURE FROM THE STANDPOINT THAT MOST OF THE AREA IS GRAVEL COVERED OR COVERED WITH CONCRETE OR ASPHALT. THERE'S NOT THAT MANY OPEN AREAS WITHIN THE MAIN INDUSTRIAL AREA.

MRS. WOOD: WHAT WERE YOUR INDUSTRIAL BUILDINGS? BUILDING 900 OR --

MR. WATTRAS: YES, WE'RE GOING TO TALK ABOUT THIS RIGHT NOW. BUILDING 900 AREA IS A FORMER MAINTENANCE AREA. AND THAT'S WHERE WE KNOW WE HAVE A CONTAMINATE PLUME OF SOLVENTS IN THE GROUNDWATER AND THAT'S WHERE WE CURRENTLY ARE CONSTRUCTING A REMEDIATION SYSTEM TO CONTAIN THE MIGRATION OF THIS PLUME AND WE'RE READY TO -- THEY'RE BUILDING IT RIGHT NOW IN FACT. THIS -- WE DISCUSSED THIS EFFORT ABOUT TWO YEARS AGO. I THINK BACK IN 1992 THE DECISION WAS MADE TO PUT IN SOME CONTAINMENT WELLS TO CONTAIN ANY MIGRATING OF THIS PLUME BY THE 900 BUILDING AREA AND ALSO BY THE 1600 BUILDING AREA.

MRS. WOOD: 1600, YES.

MR. WATTRAS: NOW, THERE'S ANOTHER BUILDING 1502, WHICH WE'LL TALK ABOUT. THAT'S A DIFFERENT PROBLEM. THIS IS JUST THE 900 BUILDING AREA. UNDERNEATH THIS AREA IS WHERE WE PROBABLY HAVE THE HIGHEST LEVELS OF SOLVENTS IN GROUNDWATER.

MRS. WOOD: SO, YOU'RE TALKING ABOUT THE TCE'S?

MR. WATTRAS: THE TCE'S, YES. WE ALSO HAVE A LITTLE BIT OF BENZENE WHICH IS ASSOCIATED WITH FUELS, BUT THE

TCE IS THE MAIN -- THE SOLVENTS TCE AND OTHER THINGS LIKE THAT ARE THE MAIN CONTAMINANTS IN THIS PLUME.

MRS. WOOD: WELL, NOW, HOW DO YOU -- WHEN YOU SAY "CONTAINING IT" IS IT JUST PULLED OUT OR WHAT? WHAT ARE YOU DOING?

MR. WATTRAS: WHEN I SAY CONTAINED WE HAVE A PLUME -- IT'S PROBABLY ON ONE OF THESE FIGURES OVER HERE. I DON'T KNOW -- LET ME JUST MOVE AHEAD REAL QUICK HERE. I DON'T THINK IT'S ON THE SLIDE.

WE WILL PUT WELLS AT THE EDGE WHERE WE BELIEVE THE EDGE OF THE PLUME TO BE, THE OUTER LIMITS OF THE PLUME, AND WE KNOW THAT MY SAMPLING MONITORING WELLS. AND IN THE SOURCE AREA, FOR EXAMPLE, WE MIGHT HAVE 10,000 PARTS PER BILLION OF THE SOLVENTS. AS WE PUT IN WELLS AWAY FROM THAT ALONG THE OUTER EDGES WE MIGHT 50 OR A HUNDRED PARTS PER BILLION. SO WE SEE A NICE PATTERN GOING FROM HIGH CONCENTRATION DOWN TO LOW CONCENTRATION AND IT FOLLOWS THE FLOW. GROUNDWATER AT HADNOT POINT PRETTY MUCH FLOWS IN A, I BELIEVE, A SOUTHWEST DIRECTION -- SOUTHWEST OR SOUTHEAST DIRECTION, AND WE CAN FOLLOW THAT. AND WE PUT IN WELLS. THE WELLS ARE BEING CONSTRUCTED RIGHT NOW TO PUMP GROUNDWATER AT A RATE OF ABOUT FIVE GALLONS PER MINUTE, AND THE WELLS ARE AT THE EDGES OF THIS PLUME TO PREVENT IT FROM GOING ANY FURTHER AND THAT'S WHAT WE CALL CONTAINMENT.

MRS. WOOD: NOW, WHAT HAPPENS IF YOU GET, YOU KNOW, HEAVY EXTENDED RAINS?

MR. WATTRAS: NOT ONE OR TWO TIME EVENTS OF RAIN, IT WILL NOT EFFECT -- OTHER THAN THE WATER LEVEL RISING A LITTLE BIT.

MRS. WOOD: YEAH.

MR. WATTRAS: BUT IT REALLY WOULD NOT DO MUCH TO THE CONCENTRATIONS. I MEAN, THESE PROBLEMS AT HADNOT POINT HAVE BEEN AROUND FOR YEARS.

IN FACT, THIS PLUME THAT I'M TALKING ABOUT RIGHT NOW WAS FIRST STUDIED IN THE MID 1980'S AND THE CONCENTRATIONS HAVEN'T DIFFERED THAT MUCH. YOU KNOW, WE -- FOR EXAMPLE BACK IN THE 1980'S THEY SAW VERY SIMILAR LEVELS. IT'S NOT LIKE IN 1985 THEY SAMPLED IT AND MEASURED 10,000 AND THEN IN 1994 WE SAMPLED IT AND SAW 1,000. THAT WOULD BE A PRETTY DRASTIC CHANGE IN CONCENTRATION OVER SUCH A SHORT PERIOD. WE'VE SEEN VERY SIMILAR LEVELS.

MRS. WOOD: NOW, ARE THEY SAYING THAT -- I MEAN, WHAT ARE THEY DOING NOW TO CONTROL THIS?

MR. WATTRAS: CONTROL?

MRS. WOOD: I MEAN, DO THEY HAVE UNDERGROUND TANKS WHERE THESE SOLVENTS ARE OR IS IT JUST --

MR. WATTRAS: NO, THE SOLVENTS, THEY'RE -- WE BELIEVE THERE MAY HAVE BEEN ONE TANK THAT WAS USED FOR SPENT SOLVENTS. THAT TANK AS FAR AS WE KNOW HAS SINCE BEEN REMOVED.

THERE ARE OTHER UNDERGROUND STORAGE TANKS RELATED TO FUEL. I MEAN, THAT -- WE DON'T BELIEVE THOSE TANKS ARE ASSOCIATED WITH THIS PROBLEM.

BUT WE DID LOOK AT SOIL AND FOUND VERY LITTLE OF THE SOLVENTS IN THE SOIL IN THE HIGHEST AREA THAT WE KNOW OF GROUNDWATER CONTAMINATION WE PULLED SOIL SAMPLES AND FOUND VERY LOW LEVELS WHICH GOES BACK TO SOMETHING WHERE I SAID -- WHAT I WAS TALKING ABOUT LAST NIGHT. I THOUGHT I MAYBE SAID IT HERE AT THIS MEETING WHERE OVER TIME, YOU KNOW, KNOWING THAT THESE SPILLS HAPPENED MANY YEARS AGO THROUGH TIME WITH PRECIPITATION AND EVERYTHING IT SORT OF -- THE SOLVENTS WILL MOVE OUT OF THIS FRONTAL ZONE. AND THAT MIGHT BE THE CASE HERE WHERE WE HAVE VERY LOW LEVELS IN SOIL AND VERY FEW SAMPLES HAVE SOLVENTS IN THEM.

SO, THE TANK HAS -- AS FAR AS WE KNOW HAS BEEN PULLED THAT HAD SPENT SOLVENTS. AND EVEN THAT INFORMATION TO BE QUITE HONEST WITH YOU IS SKETCHY. IF WASN'T CONCRETE THAT THE TANK THAT THEY PULLED WAS USED FOR SPENT SOLVENTS; ONE REPORT SAID THAT IT DID AND ANOTHER REPORT DID NOT SAY THAT. BUT WE HAVE TO THAT FOR WHAT --

MRS. WOOD: YEAH, WE'VE GOT THE MATERIAL THERE.

MR. WATTRAS: WE AGREE, YOU KNOW, WE SUSPECT THAT THERE WAS A TANK THAT WAS USED TO COLLECT SPENT SOLVENTS.

I'LL TALK A LITTLE BIT ABOUT THE PAST INVESTIGATIONS. I JUST MENTIONED -- YOU KNOW, WE -- THERE HAVE BEEN A LOT OF INVESTIGATIONS ESPECIALLY AT HADNOT POINT SINCE THE MID-80S. NOW THIS INTERIM REMEDIAL ACTION OF THE SHALLOW AQUIFER, THIS IS WHAT I WAS JUST TALKING ABOUT THE CONTAINMENT WALLS AND WE MADE THE

DECISION BACK IN 1992 -- WHEN I SAY "WE" I SOMETIMES TALK AS A GROUP HERE -- THE DEPARTMENT OF THE NAVY AND THE MARINE CORPS MAKES THE DECISION.

MRS. WOOD: MARINE CORPS.

MR. WATTRAS: THEY MADE THE DECISION TO GO WITH THE CONTAINMENT ALTERNATIVE WHICH WAS ACCEPTED BY THE EPA AND THE STATE OF NORTH CAROLINA.

WHAT WE'RE DOING NOW WE STARTED IN 1993/1994. WE'RE NOW LOOKING AT THE ENTIRE HADNOT POINT AREA. SEE, THE DIFFERENCE BETWEEN THIS STUDY OF 1993 AND 1994 VERSUS 1991 AND 1992, IN THAT INTERIM STUDY WE WERE JUST FOCUSING ON "LET'S DO SOMETHING ABOUT THIS PROBLEM NOW. LET'S CONTAIN IT." AND THAT WAS THE ALTERNATIVE CHOSEN. BUT IT JUST FOCUSED ON SHALLOW GROUNDWATER. THE STUDY OF 1993 AND 1994 LOOKED AT OTHER PORTIONS OF THE AQUIFER, LOOKED AT SURFACE WATER AND SEDIMENT AND LOOKED AT SOIL. THAT'S THE DIFFERENCE BETWEEN THESE TWO INVESTIGATION.

MRS. WOOD: WHAT ABOUT THE DEEP AQUIFER, YOU DIDN'T FIND ANY --

MR. WATTRAS: ABOUT THE?

MRS. WOOD: THE DEEP AQUIFER.

MR. WATTRAS: WE'LL TALK ABOUT THAT IN A MINUTE HERE.

BASICALLY, TO THROW OUT THE TERM REMEDIAL INVESTIGATION, THIS IS DONE UNDER CERCLA. THE OBJECTIVE OF REMEDIAL INVESTIGATION IS TO FIND OUT WHAT IS THE PROBLEM AT THE SITE. HOW

BAD IS THE PROBLEM, WHAT KIND OF CONTAMINANTS ARE THERE, AT WHAT CONCENTRATIONS. AND ONCE WE COLLECT ALL THAT DATA THE MAIN PART OF REMEDIAL INVESTIGATION IS TO DETERMINE WHAT IS THE IMPACT TO HUMAN HEALTH AND THE ENVIRONMENT.

SO, IN A NUTSHELL THE REMEDIAL INVESTIGATION LOOKS AT WHAT'S AT THE SITE, TRIES TO FIGURE OUT WHERE IS IT GOING, HOW DEEP HAS IT MIGRATED, HOW FAR OFF-SITE HAS IT MIGRATED VERTICALLY -- OR HORIZONTALLY AND WHAT DOES THIS MEAN TO THE PEOPLE WORKING THERE OR THE ENVIRONMENT.

NOW, HERE'S WHAT WE FOUND AND THIS IS WHERE I'LL GET INTO THESE DIFFERENT AQUIFERS. WE CONFIRMED -- WE KNEW RIGHT THEN WE HAD TWO MAIN PLUMES TO LOOK AT. WE PUT IN A FEW MORE WELLS TO MAKE SURE WE KNEW THE EXTENT -- THE HORIZONAL EXTENT OF THESE PLUMES. WE DEFINED THE HORIZONAL EXTENT OF THE PLUMES. WE FEEL VERY COMFORTABLE THAT WE HAVE A GOOD IDEA OF HOW FAR THE CONTAMINATION HAS MIGRATED HORIZONTALLY. AND AS I MENTIONED BEFORE THE TWO PLUMES ARE AT THE 900 BUILDING AREA AND THE 1600 BUILDING AREA.

WE ALSO RECOGNIZED THE BTEX PLUME AT SITE 22 WHICH NEAL TALKED ABOUT EARLIER. WE HAD TOTAL METALS -- WE HAD SOME METALS THROUGHOUT HADNOT POINT AND AT NO SPECIFIC PATTEN. PRETTY MUCH RANDOM HITS OF LEAD, CHROMIUM, MANGANESE, IRON, BUT NO PARTICULAR PATTERN THAT YOU CAN ASSOCIATE IT WITH A PLUME. WE FOUND THIS AT OTHER SITES TOO. WE'RE NOT SO SURE THESE METALS ARE NECESSARILY DUE TO DISPOSAL ACTIVITIES. THEY COULD BE DUE TO A LOT OF OTHER

THINGS SUCH AS THE GEOLOGIC CONDITIONS OF THE SHALLOW AQUIFER AND POSSIBLY --

MRS. WOOD: WOULD YOU EXPAND ON THAT A LITTLE BIT BECAUSE I DON'T UNDERSTAND THAT.

MR. WATTRAS: OKAY.

MRS. WOOD: YOU KNOW, THE CHROMIUM I DON'T UNDERSTAND.

MR. WATTRAS: THAT'S FINE.

MRS. WOOD: WHERE WOULD THEY COME FROM IN YOUR --

MR. WATTRAS: FROM THE SOIL ITSELF. THE SOIL SAMPLES WILL HAVE CHROMIUM AND LEAD.

MRS. WOOD: YEAH, I MEAN --

MR. WATTRAS: AND THAT'S NATURALLY OCCURRING. I MEAN --

MRS. WOOD: MANGANESE, I --

MR. WATTRAS: MANGANESE -- EVEN LEAD -- YOU HAVE SOME LEAD IN SOILS, AND SOME LEAD FROM PARTICULATES AND SO FORTH.

WHEN WE PUT IN A SHALLOW WELL THE SHALLOW AQUIFER IS IMPOUNDED ABOUT FIVE TO TEN FEET BELOW GROUND SURFACE HERE AT HADNOT POINT DEPENDING UPON WHERE YOU'RE AT.

THE CHARACTERISTICS OF THE AQUIFER, IT'S VERY LOOSELY COMPACTED, VERY SANDY; IT'S NOT TIGHTLY COMPACTED. WE PUT IN A WELL, WE HAVE A SCREEN IN THE WELL THAT TRIES TO GET OUT THESE

SILTS AND SANDS FROM THE SAMPLE, BUT YOU STILL HAVE SOME THAT GO THROUGH THE SLOTS OF THE SCREEN.

WHEN WE SAMPLE WE TRY TO TAKE PRECAUTIONS WHEN WE PULL A SAMPLE NOT TO HAVE ANY SUSPENDED SOLIDS IN THAT WATER SAMPLE. IT'S VERY HARD TO DO THAT IN THIS GEOLOGIC FRAMEWORK BECAUSE OF THE LOOSELY COMPACTED SILTS AND SANDS.

NOW, OUR DEEP WELLS, AND HERE'S THE ONLY PATTERNING THAT WE'RE SEEING, WE'RE SEEING THESE TOTAL METALS AND TOTAL METALS MEANS JUST THAT; IT'S A SAMPLE OF THE WATER IT'S TAKEN STRAIGHT TO THE LABORATORY, IT'S NOT FILTERED.

SO, WITH THE -- THE ANALYSIS MIGHT BE BIASED HIGH A LITTLE BIT BECAUSE OF THE FINDS OR PARTICULATES IN THE SAMPLE. I CAN TELL YOU THIS THAT WE ALSO LOOK AT DISSOLVED METALS. AND WHEN WE LOOK AT DISSOLVED METALS THAT WATER SAMPLE IS PUT THROUGH A FILTER FIRST, AND ALL THE FINDS ARE TAKEN OUT OR ANY MATTER, YOU KNOW, IT COULD BE SOME BACTERIA OR WHATEVER THAT COLLECTS IN THE WELL, THAT'S SCREENED AWAY AND THEN THAT SAMPLE IS SENT TO THE LABORATORY.

NOW, WHEN WE LOOK AT DISSOLVED WATER SAMPLES WE REALLY DON'T FIND A METALS PROBLEM. ANOTHER PLACE WHERE WE REALLY DON'T FIND A METALS PROBLEM IS IN DEEP GROUNDWATER AND WE BELIEVE THE REASON IS -- WE USE THE SAME SAMPLING TECHNIQUES, BUT IN THE DEEP GROUNDWATER THE WAY THE GEOLOGY IS YOU HAVE VERY TIGHTLY COMPACTED SILTS AND SANDS. THEY'RE VERY TIGHT AS OPPOSED TO THE SHALLOW WHERE THEY'RE LOOSE. AND IN THE DEEP AQUIFER WE DON'T REALLY HAVE

MUCH OF A METALS PROBLEMS. WE HAVE THE MANGANESE. WE HAVE FOUND THIS MANGANESE IN SOME OF THE DEEP WELLS AND I BELIEVE OUT OF ALL OF OUR DEEP WELLS, I THINK, WE HAD ONE HIT OF LEAD THAT WAS JUST ABOVE THE DRINKING WATER STANDARDS AND IT -- THE DRINKING WATER STANDARDS FOR LEAD -- IT'S 15.

MRS. WOOD: 15, YEAH.

MR. WATTRAS: WE FOUND ONE HIT OF LEAD AT 16 IN ONE DEEP WELL. SO, FOR THE MOST PART THE PATTEN THAT WE'RE SEEING IS THE SHALLOW HAS CONSISTENTLY SHOWN US HIGH TOTAL METALS, NOT JUST AT HADNOT POINT, EVEN IN SOME OF OUR BACKGROUND WELLS THAT WE HAVE THROUGHOUT THE BASE, AND EVEN AT SOME OFF-BASE WELLS. WE'VE LOOKED AT SOME STUDIES THAT WERE DONE -- I'M NOT SURE IF IT WAS MENTIONED HERE LAST NIGHT ABOUT CAMP LEJEUNE ACQUIRING 40,000 ACRES OF LAND.

MRS. WOOD: OH, YEAH. YEAH. RIGHT.

MR. WATTRAS: SO THERE'S BEEN A COUPLE OF STUDIES DONE THERE WHERE THE SAME PATTERN HAS OCCURRED WHERE THE SHALLOW AQUIFER EVERY TIME WE LOOK AT TOTAL METALS IT SHOWS US SOME ELEVATED LEVELS WHICH WOULD BE ABOVE DRINKING WATER STANDARDS.

MRS. WOOD: WELL, THEY HAVE NOT DONE A SOIL STUDY ON THIS AREA THAT WOULD HAVE DEFINED WHAT TO EXPECT IN YOUR TOTAL METALS. I MEAN, BEFORE YOU STARTED THIS PROGRAM THERE ISN'T SOME --

MR. WATTRAS: WELL, WE LOOKED AT THE SOIL

RESULTS. WE COMPARED THE SOIL RESULTS, IF I'M UNDERSTANDING YOUR QUESTION --

MRS. WOOD: NO, I'M JUST SAYING --

MR. PAUL: DIDN'T THE STATE STUDY THIS AREA?

MRS. WOOD: -- JUST A GENERAL STUDY.

MR. WATTRAS: NO, NOT BEFORE THIS. WE JUST LOOKED AT THIS, WE DID A PRELIMINARY STUDY PROBABLY ABOUT TWO MONTHS AGO AND BAKER LOOKED AT 21 SITES AT CAMP LEJEUNE AND THESE WERE -- THE 21 SITES MAKE UP DIFFERENT INVESTIGATIONS THAT WE'RE LOOKING AT, DIFFERENT PHASES AND SO FORTH. AND AT ALL 21 SITES WE HAD HIGH TOTAL METALS AND WE HAD A NUMBER OF WHAT WE CALL BACKGROUND WELLS. THESE ARE WELLS THAT ARE INSTALLED OFF-SITE, UPGRADIENT, WITH RESPECT TO FLOW THAT WE WOULDN'T EXPECT THAT WELL TO BE CONTAMINATED FROM THIS SITE. FOR EXAMPLE, IF THIS SITE IS SITTING HERE AND THERE'S A HILL COMING UP THIS WAY, WE MIGHT PUT A WELL UP HERE, WHICH WE HOPE IS GOING TO TELL US WHAT IS OUR BACKGROUND CONCENTRATIONS.

WELL, I THINK WE LOOKED AT 14 BACKGROUND WELLS, AND I BELIEVE -- I'M GOING TO SAY EITHER SIX OR NINE OF THE BACKGROUND WELLS ALSO HAD THIS SAME TOTAL METALS PATTERN IN THE SHALLOW AQUIFER.

SO, THE OTHER THING WE DID TOO TO LOOK AT THIS TOTAL METALS PROBLEM IS WE LOOKED AT THE SOIL RESULTS TO SEE IF THERE WAS A CORRELATION BETWEEN WHAT WE SEE IN THE SOIL AND HIGH LEVELS

IN THE SHALLOW GROUNDWATER. AND WE LOOKED AT SOIL RESULTS FROM I'LL SAY A CLEAN WELL, A WELL THAT SHOWED NO REAL ELEVATED LEVELS OF METALS AND THE SOIL RESULTS WE LOOKED AT THAT, AND WE COMPARED THOSE SOIL RESULTS WITH SOIL RESULTS TAKEN FROM ANOTHER AREA THAT EXHIBITED HIGH TOTAL METALS AND THERE WAS NO DIFFERENCE. SO, WE SAID THERE'S NO SOURCE.

I MEAN, WHEN YOU HAVE A GROUNDWATER PROBLEM YOU HAVE TO ASSOCIATE IT WITH A SOURCE. WE COULD NOT CORRELATE THESE TOTAL METALS IN SHALLOW GROUNDWATER WITH A SOURCE IN SOIL. SO, WE PRETTY MUCH PRELIMINARILY -- WE'VE ONLY CONDUCTED ONE STUDY AND THIS IS SOMETHING THAT WE'RE GOING TO LOOK AT ON AND ON BECAUSE WE'RE FACING THIS PROBLEM WITH EVERY SITE OF TOTAL METALS. AND WE HAVE TO -- OBVIOUSLY THE STATE OF NORTH CAROLINA AND EPA STANDARDS ARE BASED ON TOTAL METALS AND THAT'S A PROBLEM BECAUSE WE'RE NOT SO SURE WHETHER THESE TOTAL METALS ARE NECESSARILY RELATED TO DISPOSAL ACTIVITIES OR WHETHER THEY'RE RELATED TO A COMBINATION OF THE GEOLOGIC FRAMEWORK AND SAMPLING TECHNIQUES.

MRS. WOOD: NOW, AS A CORPORATION ARE YOU RESPONSIBLE FOR MAKING -- I MEAN, YOU ALL ARE DOING THIS WORK AND GETTING PAID FOR IT, BUT I THINK THE STATE WOULD HAVE TO COME IN AND DO COMPLEMENTARY STUDIES. I DON'T SEE WHY YOU WOULD HAVE TO BE RESPONSIBLE IF IT IS A GEOLOGICAL CONDITION OR A NATURAL CONDITION TO FIND THAT.

MR. WATTRAS: WE ARE -- WE'RE --

MR. WATTERS: NOT -- NOT --

MR. WATTRAS: SORRY GO AHEAD, PATRICK.

MR. WATTERS: NOT NECESSARILY. THE STATE WOULDN'T HAVE TO COME IN AND DEAL WITH THAT. IT'S JUST THAT IN THIS PARTICULAR CASE THE STATE WILL TELL WHOEVER IS WORKING ON THE PROBLEM TO SHOW US WHETHER OR NOT THIS IS REAL OR WHETHER OR NOT THIS IS --

MRS. WOOD: SO, IN OTHER WORDS THEY'RE THE ONES THAT COME IN --

MR. WATTERS: IT'S UP TO WHOEVER OWNS THE PROPERTY.

MRS. WOOD: THEY HAVE TO REVEAL THOSE STANDARDS. I MEAN, THEY COULD COME IN AND SAY THIS IS A NATURAL CONDITION THAT THEY ARE FINDING AND YOU WOULD HAVE TO MAKE THAT DETERMINATION. SO, IF THIS CAME UP SOMEWHERE DOWN THE LINE IF THEY ARE FINDING, YOU KNOW, IT AS A NATURAL PHENOMENON.

MR. WATTERS: IF THERE'S SOMETHING TO PAY WELL I GUESS IT GOES BACK TO THE GENERAL ASSEMBLY AND WE NEED TO DEAL WITH THE STANDARD, BUT IN THE MEAN TIME WE HAVE TO DEAL WITH THE INITIAL --

MRS. WOOD: COULDN'T YOU DO A WAIVER?

MR. WATTERS: WE COULD DO THE WAIVER SYSTEM BUT --

COURT REPORTER: WAIT I CAN'T HEAR HER.

MR. WATTRAS: CAN YOU SPEAK UP?

MS. TOWNSEND: WE MET WITH THE GROUNDWATER

SECTION UP IN WILMINGTON AND THIS ISSUE CAME UP AND RAY AND HIS GROUP HELPED PRESENT THE FACTS OF WHAT WE WERE FINDING AND THE CONCLUSION WAS LIKE IN THIS EVENT. AND WE'RE TRYING TO SEE WHAT'S ACTUALLY GOING ON, WHAT WE THINK IS GOING ON. YOU KNOW, WE PROVED IT ON PAPER, BUT WE NEED TO SEE WHAT'S ACTUALLY IN THE ACTUAL SAMPLE AND WE HAVEN'T DONE THAT IN THE PAST. THAT'S WHERE WE'RE HEADING.

MR. WATTRAS: ANOTHER THING THAT WE'RE DOING -- TOM BIXIE HERE WORKS FOR BAKER AND HE'S INVOLVED WITH A PROJECT FOR AN INDUSTRIAL CLIENT WHERE THEY HAD THE SAME SITUATION WHERE THEIR TOTAL METALS WERE VERY HIGH AND THEY WEREN'T REALLY CONVINCED THAT THESE METALS WERE DUE TO WHAT WAS DISPOSED OF AT THIS SITE HE WAS WORKING AT AND THERE'S NOW DIFFERENT SAMPLING TECHNIQUES THAT WE'RE GOING TO TRY IN THE FUTURE TO ELIMINATE THE SUSPENDED PARTICLES, YOU KNOW, TRY TO REDUCE THAT DOWN. SO, WE'RE GOING TO TRY THAT IN OUR NEXT INVESTIGATION, A LITTLE BIT DIFFERENT SAMPLING TECHNIQUES. SO, THERE'S SOME THINGS THAT WE'RE LOOKING AT BECAUSE, YOU KNOW, IT COULD BE PARTLY DUE TO THE SAMPLING TECHNIQUE.

MRS. WOOD: YEAH.

MR. WATTRAS: I MEAN, THERE'S NO DOUBT ABOUT IT.

MRS. WOOD: YEAH.

MR. WATTRAS: NOW, THE GEOLOGIC FRAMEWORK IS ONE THING, BUT WE'VE GOT TO TRY TO DEAL WITH THAT AND THAT'S WHAT

WE'RE GOING TO TRY TO.

CORRECT ME IF I'M WRONG GINA, BUT I WAS TALKING TO N.U.S., YOU KNOW, AT THE MEETING THE OTHER DAY AND THEY'RE WORKING AT CHERRY POINT, WHICH IS ABOUT AN HOUR AWAY, AND THEY -- THEY'RE RUNNING INTO SIMILAR PROBLEMS ALSO AND IT'S BECAUSE OF THIS LOOSELY COMPACTED SANDS AND SILTS OF THE SHALLOW AQUIFER AND THEY'RE ALSO GOING TO BE TRYING THIS LOW FLOW TECHNIQUE --

MRS. WOOD: TO SEE --

MR. WATTRAS: -- TO SEE.

MRS. WOOD: -- WHAT CHANGES.

MR. WATTRAS: NOW, THE INTERMEDIATE GROUNDWATER AND THE DEEP GROUNDWATER WERE ALSO STUDIED. WE SAW A DRASTIC CHANGE IN CONCENTRATION COMPARED TO THE SHALLOW, WHICH IS GOOD. THE INTERMEDIATE I'M TALKING ABOUT DEPTHS OF ABOUT 75 FEET; ROUGHLY 75 FEET. THE DEEP, I'M REFERRING TO DEPTHS OF ABOUT 150 TO 175.

NOW, THE SUPPLY WELLS IN THE HADNOT POINT AREA, AND THERE ARE QUITE A FEW. THERE ARE ABOUT -- AT LEAST SIX SUPPLY WELLS SURROUNDING THE HADNOT POINT AREA. THEY ARE SCREENED IN SEVERAL INTERVALS. THESE SUPPLY WELLS AND THEY'RE ALL -- THEY ARE SHUT DOWN. THEY'VE BEEN SHUT DOWN FOR A NUMBER OF YEARS, BUT THEY ARE SCREENED AT ABOUT 75 FEET AND THEN DOWN BELOW FURTHER AT ABOUT 150 UP TO 200 FEET AND THAT'S WHY THE INTERMEDIATE WELLS WERE INSTALLED, AND THESE WERE INSTALLED BY ANOTHER FIRM, BUT THEY INSTALLED THEM, I BELIEVE, TO MATCH THE SCREENING INTERVALS OF THE

SUPPLY WELLS.

AGAIN, WHAT WE SAW WAS A DRASTIC CHANGE IN CONCENTRATION BETWEEN WHAT WE ARE SEEING IN THE SHALLOW AND THEN WHAT WE'RE SEEING IN THE INTERMEDIATE AND EVEN LOWER IN THE DEEP. AND IN THE DEEP I WOULD ALMOST SAY WE HAVE NOT MUCH OF A PROBLEM AT ALL. THERE WAS JUST BENZENE AND, IN FACT, IT WAS AT A WELL NEAR HADNOT POINT FUEL FARM. THAT WAS AT ABOUT FIVE PARTS PER BILLION, WHICH IS JUST AT THE M.C.L., MAYBE FIVE, MAYBE SIX; IT WAS RIGHT AROUND THE M.C.L. EVERYTHING ELSE IN THE DEEP WAS PRETTY -- WHAT WE WOULD CALL CLEAN; MEANING, BELOW THE DRINKING WATER STANDARDS.

MRS. WOOD: NOW, THESE WERE THE FIGURES YOU GOT AND YOU'RE NOT RELYING ON THE ONES THAT WERE TAKEN FROM THE PREVIOUS STUDIES?

MR. WATTRAS: YEAH. OH, YEAH. WE RE-SAMPLED THESE WELLS. THESE WELLS HAVE BEEN SAMPLED SEVERAL TIMES. WE ARE SEEING SOME PATTERN OVER TIME THAT THE CONCENTRATIONS IN THE INTERMEDIATE AND DEEP HAVE BEEN DECREASING.

WE DID TAKE ONE MORE SAMPLE -- OR ANOTHER ROUND OF SAMPLES LATE IN THE INVESTIGATION AND THEY SLIGHTLY INCREASED. SO, OVERALL THERE HAS BEEN A TREND OF DECREASE IN CONCENTRATIONS WITH THE EXCEPTION OF THE LAST ROUND; THEY INCREASED SLIGHTLY. NOT -- I MEAN, I'M NOT TALKING A MAJOR INCREASE, BUT I CAN'T SAY THAT EVERY SAMPLING ROUND THEY WENT DOWN, DOWN, DOWN, DOWN IN CONCENTRATION, BUT THE LAST ONE WAS SLIGHTLY HIGHER THAN THE PREVIOUS ONE.

WE'LL TALK A LITTLE BIT ABOUT THE SOIL. AS EXPECTED WITHIN SITE 21 WE HAD SOME HIGH LEVELS OF PESTICIDES IN THAT MIXING AREA AND ALSO IN THE PCB DISPOSAL PIT. WE FOUND PCB'S AT 4.6 PARTS PER MILLION. THAT IS A LITTLE BIT ELEVATED. I WOULDN'T -- YOU HAVE A -- WHAT'S CALLED A TSCA WASTE WHEN YOU HIT 50 PARTS PER MILLION AND THAT'S WHEN YOU REALLY HAVE A PROBLEM. SO, WE'RE -- WE DO HAVE SOME ELEVATED LEVELS. THEY'RE AT FOUR -- ROUGHLY FOUR AND A HALF PARTS PER MILLION AND THAT WAS THE MAXIMUM CONCENTRATION. IN FACT, THAT WAS RIGHT FROM THE CENTER CORE OF THE PIT.

AT SITE 24 WE HAD SOME METALS THAT WERE ABOVE WHAT WE CALL BACKGROUND CONCENTRATIONS IN THE SOIL. AGAIN, AS WE INVESTIGATE EACH SITE WE ALWAYS TAKE BACKGROUND SAMPLES OF EACH SITE AND WE'VE BEEN -- WE HAVE A DATABASE THAT HAS BEEN ACCUMULATING OVER TIME. THE METALS IN -- AT SITE 24 WERE SLIGHTLY ABOVE THOSE BACKGROUND CONCENTRATIONS, BUT I WILL SAY WHEN WE COMPARED THE SOIL RESULTS AT SITE 24 WITH SITE 21 AND 78 THEY WERE PRETTY COMPARABLE. AND SEE, AT SITE 24 THAT'S A FLY ASH DUMP, WE THOUGHT WE WOULD SEE SOME ELEVATED LEVELS OF METALS.

SO, IN ONE SENSE, I'LL SAY THAT YES, THEY WERE ELEVATED BECAUSE THEY WERE ABOVE BACKGROUND, BUT WHEN WE COMPARED THEM TO SITES 21 AND 24 THEY WERE COMPARABLE. SO, WE DIDN'T SEE MUCH OF A PATTERN BETWEEN THE THREE SITES IS WHAT I WOULD SAY.

MRS. WOOD: YOU'VE GOT A PROBLEM GENERALLY.

MR. WATTRAS: WE DON'T BELIEVE IT WAS MUCH OF

A PROBLEM THERE. WE HAD A PESTICIDE THAT WAS DETECTED IN ONE SOIL SAMPLE, THIS HEPTACHLOR EPOXIDE IT WAS AT A LOW CONCENTRATION DOWN AT SITE 24. IT WAS ALSO -- AND I'M KIND OF JUMPING AHEAD OF MYSELF, BUT THE REASON WE PUT IT UP ON THE SLIDE THAT PESTICIDE WAS ALSO FOUND IN GROUNDWATER IN THE SHALLOW AQUIFER AT SITE 24.

HERE'S A CASE WHERE, AGAIN, WE FOUND IT AT LOW LEVELS IN THE GROUNDWATER, BUT IN OUR SOIL WE REALLY DIDN'T SEE MUCH OF IT. WE CAN'T -- WE'RE REALLY NOT TOO CLEAR ON WHAT HAPPENED THERE. YOU KNOW, DID WE MISS THE SOURCE OR IS THE SOURCE DEPLETED FROM THE SOIL, OR -- I MEAN, ANOTHER POSSIBILITY WOULD BE THE SAME SITUATION WITH THE METALS, DID WE GET A GROUNDWATER SAMPLE THAT HAD SOME FINDS IN IT OF SOME PESTICIDES THAT WAS REALLY MORE OR LESS RELATED TO THE SEDIMENT AS OPPOSED TO BEING IN GROUNDWATER. BECAUSE ONE THING ABOUT PESTICIDES THEY'RE NOT -- NUMBER ONE, THEY'RE NOT THAT MOBILE IN THE ENVIRONMENT. THEY DON'T MIGRATE LIKE A SOLVENT WILL. IF YOU HAVE A GASOLINE SPILL OR A SOLVENT SPILL AND IT WOULD RAIN OVER TIME THAT WOULD PRETTY MUCH GO TO THE GROUNDWATER PRETTY QUICK. PESTICIDES STAY WITH THE SOILS. THEY DON'T MIGRATE THAT READILY. SO, WE WERE A LITTLE BIT SURPRISED TO SEE IT IN THE GROUNDWATER ESPECIALLY WHEN WE SAW THAT OUR HIGHEST LEVEL IN SOIL WAS VERY, VERY LOW. THAT'S FIVE PARTS PER BILLION. THAT'S EXTREMELY LOW TO SEE IT -- THINKING THAT IT MIGHT BE PART OF THE GROUNDWATER PROBLEM.

SO, I'M GOING TO JUMP AHEAD OF MYSELF A LITTLE BIT RIGHT HERE. WE ARE GOING TO MONITOR THAT. WE'RE GOING TO LOOK AT THOSE

WELLS SOME MORE TO TRY TO FIGURE OUT, IS THERE REALLY A GROUNDWATER PROBLEM ASSOCIATED WITH PESTICIDES. AGAIN, IT WAS AT VERY LOW LEVELS OR WAS THAT A SAMPLE THAT MIGHT HAVE BEEN BIASED HIGH DUE TO SOME PARTICULATES THAT MAY HAVE ACCUMULATED IN THE SAMPLE ITSELF.

SITE 78 -- AT SITE 78 WE FOUND SOME HIGH LEVELS OF PESTICIDES AROUND BUILDING 1502 AND THE HISTORY OF THAT BUILDING AS FAR AS WE KNOW AND WHAT WE CAN TELL WAS NEVER USED FOR PESTICIDE MIXING AND HANDLING. SO, ALTHOUGH THE HISTORY DOESN'T TELL US ANYTHING WE DO KNOW WE HAVE SOME HIGH LEVELS OF PESTICIDES THAT WILL BE TAKEN CARE OF.

NOW, VOC'S, THESE ARE THE VOLATILES, WE DID FIND THEM AT SEVERAL BUILDING AREAS AND WE ALSO FOUND PAH'S, WHICH ARE ANOTHER GROUP OF CONTAMINANTS, MAINLY IN THE 900 BUILDING AREA AS I MENTIONED. THEY WERE AT LOW LEVELS THOUGH. SO, WE SHOULD OF MAYBE ADDED THAT TO THE SLIDE, THAT THEY WERE DETECTED, BUT AT PRETTY LOW LEVELS. NOTHING WHERE WE WOULD SAY THERE IS A CONTINUING SOURCE OF A GROUNDWATER PROBLEM. I MEAN, WE'RE TALKING IN THE PARTS PER BILLION RANGE.

COLONEL WOOD: WHAT SIDE OF THE MAIN ROAD IS 1502 ON AS YOU GO IN?

MR. WATTRAS: PARDON ME?

COLONEL WOOD: WHAT SIDE OF THE ROAD IS IT ON? THE RIGHT SIDE OR THE LEFT SIDE?

MR. WATTRAS: OF BUILDING --

COLONEL WOOD: IN THE INDUSTRIAL AREA?

MR. WATTRAS: I DON'T RECALL.

MR. HAVEN: IT'S IN THE INDUSTRIAL AREA.

COLONEL WOOD: IT'S IN THE INDUSTRIAL AREA?

MR. HAVEN: YES, SIR. YES, SIR. IT WOULD BE MORE IN THE SOUTHWESTERLY END.

MS. BERRY: IT'S RIGHT HERE. YOU CAN SEE IT HERE.

COLONEL WOOD: I'M SORRY, I THOUGHT IT WAS -- MIGHT BE ASSOCIATED WITH THE WASH TOWER AND THE HARDSTAND WHERE THEY USED TO WASH DOWN VEHICLES AND THINGS LIKE THAT. AND --

MR. HAVEN: NO, SIR; IT'S --

MS. BERRY: IT'S RIGHT OFF GIBB STREET, RIGHT HERE.

COLONEL WOOD: I'M WITH YOU. OKAY, THANK YOU. THANK YOU. I'M SORRY.

MR. WATTRAS: FROM A STANDPOINT OF HUMAN HEALTH RISK WE COLLECT ALL THIS INFORMATION. LOOKING AT THE ACTIVITIES AT HADNOT POINT WE LOOK AT, YOU KNOW, THE PEOPLE WORKING THERE AND HOW THEY WOULD BE EXPOSED TO THIS. THE RISK ASSESSMENT RESULTS SHOWED THAT THERE IS -- THAT THE NUMBERS -- THE INCREMENTAL CANCER RISKS OR THE CHANCE OF ACQUIRING CANCER DUE TO EXPOSURE ARE WITHIN ACCEPTABLE RANGE AS DEFINED BY EPA. CAN I SAY THAT?

MS. TOWNSEND: (NODS HEAD.)

MR. WATTRAS: OKAY. WHICH IS THE RANGE OF ONE IN 10,000 TO ONE IN ONE MILLION. WE ALSO LOOK AT OTHER THINGS SUCH AS WHAT'S CALLED THE HAZARD INDEX, AND THAT'S AN INDEX OF ONE. THAT HAZARD INDEX TAKES INTO ACCOUNT THINGS LIKE LIVER DAMAGE, THINGS THAT ARE OBVIOUSLY NOT CANCER RELATED, BUT IMPACTS THE BODY; SUCH AS THE KIDNEY OR THE LIVER OR OTHER THINGS. AND IT WAS ACCEPTABLE FOR SOIL, BUT NOT FOR GROUNDWATER WHICH WE EXPECTED AT THOSE HIGH LEVELS SOMEBODY -- YOU KNOW, WE DON'T WANT SOMEBODY DRINKING THAT SHALLOW AQUIFER. THAT WOULD GIVE THEM AN UNACCEPTABLE RISK.

NOW, YOU HAVE TO REMEMBER TOO ABOUT THE GROUNDWATER WHEN WE DO A RISK ASSESSMENT CURRENTLY THERE'S REALLY NO EXPOSURE. PEOPLE OBTAIN THEIR WATER FROM SUPPLY WELLS -- FROM CLEAN SUPPLY WELLS. SO, UNDER CURRENT SITUATIONS THERE'S NO RISK TO HUMAN HEALTH WITH THE GROUNDWATER.

NOW, IF HADNOT POINT OR CAMP LEJEUNE WOULD SHUT DOWN ONE DAY AND SOMEONE DECIDED TO TURN IT INTO A COMPLEX AND THEY INSTALLED THEIR WELLS IN THE SHALLOW AQUIFER THEY WOULD HAVE AN UNACCEPTABLE RISK.

SO, WHEN WE DO A RISK ASSESSMENT YOU LOOK AT THE CURRENT SITUATION AND YOU ALWAYS HAVE TO PROJECT OUT, AND WE CALL THAT THE FUTURE POTENTIAL RISK. IT'S A CONSERVATIVE WAY OF LOOKING AT THINGS, BUT YOU KNOW, THINGS OVER TIME CHANGE. IT COULD BE REALISTIC IN A LOT OF CASES. AND AT CAMP LEJEUNE WE THINK RIGHT NOW THAT WOULD BE PRETTY UNREALISTIC.

I'LL HAVE TOM BIXIE TALK A LITTLE BIT ABOUT ECOLOGICAL RISKS BECAUSE THAT'S THE OTHER PART OF THE RISK ASSESSMENT WHICH PLAYS A GREAT IMPORTANCE IS LOOKING AT, YOU KNOW, DO THESE CONTAMINANTS IMPACT THE TERRESTRIAL HABITAT OR THE AQUATIC HABITAT.

MR. BIXIE: AT THE SITE WE DID LOOK AT WHAT WOULD BE THE IMPACTS FROM -- FROM THE SITE AND THE CONTAMINANTS ON BOTH THE AQUATIC, ENVIRONMENT AND THE TERRESTRIAL. WE TOOK SOME SURFACE WATER AND SEDIMENT SAMPLES AND COMPARED THESE TO STANDARDS THAT HAVE ESTABLISHED FOR SCREENING VALUES TO SEE IF -- IF THERE WERE ANY EXCEEDANTS OF THESE VALUES, AND NOT ONLY IF THERE WERE ANY EXCEEDANTS; WHERE WERE THEY, WERE THEY UP STREAM OR WERE THEY DOWN STREAM, WAS THERE ANY PATTERN TO THEM.

IN TERMS OF THE SURFACE SOILS WHAT WE HAVE BEEN DOING IS GOING THROUGH A SCENARIO WHERE WE MODEL THE UPTAKE OF THE CONTAMINANTS ENTERING PLANTS THAT SOME TYPE OF TERRESTRIAL WILDLIFE WOULD BE FOR EXAMPLE, A RABBIT; WE USED A RABBIT, AND WE USED A BIRD AND WE USED A DEER.

SO, WE GO THROUGH A SCENARIO JUST AS YOU GO THROUGH THE HUMAN HEALTH SCENARIO AS A SMALL CHILD USES DRINKING WATER. WE GO THROUGH AND WE HAVE THE DEER EATING SOME SOIL WHILE HE'S GRAZING ON THE PLANTS; HE'S EATING THE PLANTS AND DRINKING THE WATER FROM THE AREAS. SO, WE GO THROUGH THOSE TYPE OF SCENARIOS. IN LOOKING AT THIS PARTICULAR SITE IT LOOKS LIKE THE PESTICIDES SEEM TO REPRESENT THE MOST POTENTIAL FOR ANY TYPE OF ADVERSE IMPACT TO THE

ECOLOGICAL ENVIRONMENT. AND --

MRS. WOOD: OKAY, NOW, I'M THINKING GREAT VAST AREAS OF CEMENT THAT YOU HAVE AROUND BURGER KING. YOU'VE GOT THAT FIELD UP THERE AND YOU'RE GOT THE STEAM PLANT. WHERE IS THIS WATER GOING TO BE?

MR. BIXIE: IT'S -- IT'S IN THE TWO CREEKS THAT ARE LOCATED ON EITHER SIDE.

MRS. WOOD: I'M TRYING TO VIEW THIS.

MR. BIXIE: IT'S COGDELS CREEK AND BEAVER DAM.

MR. WATTRAS: YES, BEAVER DAM AND COGDELS CREEK.

MR. BIXIE: BEAVER DAM IS SOUTHEAST --

MR. WATTRAS: TO THE WEST OF HOLCOMB BOULEVARD. COGDELS CREEK IS TO THE EAST OF THE HADNOT POINT INDUSTRIAL AREA. MAYBE BRING THAT --

MRS. WOOD: NO, I'LL GET OVER THERE. THAT'S FINE.

(MR. WATTRAS AND MR. BIXIE SHOW MRS. WOOD A MAP OF THE LOCATION IN QUESTION.)

(PAUSE.)

MR. BIXIE: LOOKING AT THE IMPACTS OF TERRESTRIAL WILDLIFE IS NOT AS ADVANCED AS IT IS -- AS WHAT WE'RE LOOKING AT WITH IMPACTS TO FISH AND THINGS THAT LIVE IN THE WATER JUST BECAUSE WATER IMPACTS HAVE BEEN A LOT MORE WELL STUDIED OVER

THE YEARS.

WE'VE DEVELOPED THIS MODEL THAT LOOKS AT WHAT TYPE OF DOSAGE THIS PARTICULAR WILDLIFE COULD GET. JUST AS YOU COMPARE FOR HUMANS WHAT THE ALLOWABLE INTAKE EPA HAS ESTABLISHED FOR LEAD AND MERCURY OR WHATEVER THERE'S ALSO LEVELS THAT EPA HAS ESTABLISHED IN THE LITERATURE FOR DEER AND FOR RABBIT THAT MAY BE EXPOSED TO ZINC OR -- SO WE GO THROUGH THAT TYPE OF ANALYSIS AND BASED ON THAT WE CAME UP WITH PESTICIDES ARE -- SEEM LIKE THEY HAVE THE MOST IMPACT.

MRS. WOOD: THAT'S INTERESTING. THANK YOU.

MR. WATTRAS: ONCE ALL THESE THINGS ARE TAKEN INTO ACCOUNT AND WE KNOW WHAT THE POTENTIAL RISKS ARE TO BOTH HUMANS AND WILDLIFE WE WILL LOOK AT WHAT ARE THE PROBLEMS OUT THERE THAT ARE CAUSING A HIGH RISK SUCH AS THE GROUNDWATER, SUCH AS PESTICIDES OF THE SOIL OR WHATEVER. AND WE LOOK AT WHAT ARE THE BEST CLEANUP METHODS OR ALTERNATIVES IN DEALING WITH THESE PROBLEMS.

FOR THE GROUNDWATER, THERE ARE TWO PRIMARY PLUMES WHICH WE'RE LOOKING AT. AND FOR SOIL THERE ARE FOUR AREAS OF CONCERN. THREE OF THE AREAS OF CONCERN ARE WITHIN SITE 21 AND THE FOURTH ONE IS AT THIS BUILDING 1502.

I CAN TELL YOU -- NOW, THOSE AREAS OF CONCERN ARE MEASURED THERE IN SQUARE FEET. IT WOULD HAVE BEEN MAYBE A LITTLE BIT BETTER TO SHOW IT IN CUBIC YARDS. IT'S A LOT EASIER, I THINK, TO PICTURE THINGS IN CUBIC YARDS THAN SQUARE FEET, BUT I'LL TELL

YOU THAT THE PESTICIDES AND PCB'S ARE PRIMARILY UP IN THE TOP TWO FEET OF SOIL. BELOW THAT OUR SOIL SAMPLES REALLY DIDN'T FIND ANY SIGNIFICANT CONTAMINATION.

SO, DURING REMEDIATION IT WOULD PRETTY MUCH INVOLVE TAKING OUT ABOUT TWO FEET OF SOIL OVER THAT AREA. THEY ARE SMALL AREAS. NONE OF THESE AREAS ARE WHAT I WOULD CALL A HUGE AREA OF CONTAMINATION. THEY'RE PRETTY -- YOU KNOW, YOU'RE TALKING ABOUT 800 SQUARE FEET, THAT'S NOT VERY BIG. SAME THING WHERE THE HIGHEST ONE IS AT SITE 21 IS ABOUT 8,100 SQUARE FEET. THAT'S NOT THAT LARGE OF AN AREA.

THE GROUNDWATER ALTERNATIVES THAT WE LOOKED AT WOULD BE THE NO ACTION ALTERNATIVE, WHICH EVERYBODY KNOWS WE LOOK AT. INSTITUTIONAL CONTROLS WHICH WOULD BE SHUTTING WELLS DOWN, NOT ALLOWING NEW WELLS TO BE PUT IN. THE THIRD ALTERNATIVE IS REFERRED TO AS SOURCE CONTROL. AS I MENTIONED BEFORE THE ACTION THAT'S GOING ON RIGHT NOW IS CONTAINMENT ALTERNATIVE. WE'RE CONTAINING MIGRATION.

ALTERNATIVE THREE FOCUSES ON GOING TO THE HOT SPOT AND DEALING WITH THAT HOT SPOT; PUMPING FROM THAT AREA. AND IN ALTERNATIVE THREE IT WOULD SIMPLY BE ADDING ADDITIONAL WELLS IN THE HOTTEST, THE MOST CONTAMINATED PORTION OF THAT PLUME, TYING IT INTO THE EXISTING TREATMENT SYSTEM THAT IS BEING CONSTRUCTED. THE FOURTH ALTERNATIVE WOULD ALSO BE SOURCE CONTROL, BUT IT WOULD USE A DIFFERENT TECHNIQUE OF AIR SPARGING.

AIR SPARGING IS SIMPLY PULLING AIR -- PULLING AIR OUT OF

THE GROUND. BY DOING THIS IT'S ALMOST LIKE A VACUUM WHERE YOU'RE PULLING THE VOLATILES, AND VOLATILES READILY MOVE AND IT WOULD GO THROUGH AN AIR PATHWAY AND IT WOULD BE COLLECTED. THE AIR WOULD BE -- EMISSIONS WOULD BE COLLECTED.

IN THAT ALTERNATIVE THE ADVANTAGES -- YOU DON'T REALLY TREAT ANY -- YOU DON'T HAVE TO PULL ANY GROUND WATER OUT. YOU DO EVERYTHING -- WHAT WOULD BE IN SITU. YOU'RE NOT PULLING OUT ANYTHING. EVERYTHING STAYS THE SAME, IT'S JUST THAT YOU'RE SUCKING AIR OUT AND THE VOLATILES WOULD FOLLOW THAT AIR PATHWAY.

THE FIFTH ALTERNATIVE ADDRESSES THE DEEPER GROUNDWATER. THE FIRST FOUR -- OF COURSE, ONE AND TWO DON'T DO ANYTHING WITH THE GROUNDWATER, BUT THE THIRD AND FOURTH ALTERNATIVE FOCUSES JUST ON THE SHALLOW GROUNDWATER.

THE FIFTH ONE CONSIDERS WHAT WOULD HAPPEN IF -- OR WHAT WOULD BE THE COST AND OUTCOME IF WE PUT IN SOME DEEP EXTRACTION WELLS AND WENT AFTER THE CONTAMINATION IN THE INTERMEDIATE AQUIFER AND IN THE DEEP AQUIFER.

LET ME MOVE AHEAD A LITTLE BIT HERE AND I'LL GO BACK TO THAT. LET'S LOOK AT THE COST OF THESE ALTERNATIVES TOO. THE COST OF --

COLONEL WOOD: COULD YOU FOCUS THAT JUST A LITTLE BIT?

MR. WATTRAS: I'LL TELL YOU THE COST. I'M SORRY IF YOU CAN'T TELL WHAT THEY ARE. THEY ARE A LITTLE BIT HARD TO SEE.

THE ALTERNATIVES FOR GROUNDWATER RANGE ANYWHERE FROM ZERO, IF WE DID NOTHING ELSE OUT THERE, UP TO 690,000 AND THAT WAS FOR THE AIR SPARGING. THE OTHER COSTS IF WE JUST IMPLEMENTED MORE INSTITUTIONAL CONTROLS AND DID MORE MONITORING IT WOULD COST ROUGHLY $260,000.

THE THIRD ALTERNATIVE IS TO ADDRESS THE SHALLOW GROUNDWATER IN THE MOST CONTAMINATED AREA TIE THAT INTO THE EXISTING TREATMENT SYSTEM AND IT'S AT $460,000. THE OTHER TREATMENT ALTERNATIVE INVOLVING SOME REMEDIATION OF THE INTERMEDIATE AND DEEP AQUIFER IS $615,000.

I'LL TALK ABOUT SOIL LATER. I FIGURE IT'S BEST MAYBE TO GO THROUGH THE GROUNDWATER THEN WE'LL MOVE BACK AND TALK ABOUT SOIL.

THE ALTERNATIVE THAT THE DEPARTMENT OF NAVY AND MARINE CORPS IS PROPOSING WOULD BE ALTERNATIVE THREE, AND THAT'S JUST TO ADDRESS MORE CLEANUP OF THE SHALLOW GROUNDWATER IN THE HOTTEST AREA OF CONTAMINATION. AGAIN, THAT'S WHERE WE WOULD JUST ADD ON TO THE EXISTING TREATMENT SYSTEM. THE REASON ALTERNATIVE SIX WAS NOT SELECTED WAS BECAUSE WHAT WE'RE AFRAID OF IS INSTALLING SOME EXTRACTION WELLS IN THE INTERMEDIATE PORTION OF THE AQUIFER AS WELL AS THE DEEP PORTION COULD POTENTIALLY MAKE THINGS WORSE DEEPER.

MRS. WOOD: I WAS WONDERING ABOUT THAT. IF IT WOULDN'T CREATE A PULL.

MR. WATTRAS: WE'RE WORRIED ABOUT THAT

BECAUSE THERE IS NO CONFINING LAYER. YOU KNOW LAST NI(TALKED ABOUT A SEMI-CONFINING LAYER OUT AT SITE 35. AT POINT THE GEOLOGY IS TOTALLY DIFFERENT. IT'S ON THE OTHER S THE NEW RIVER. THERE IS NO CONFINING LAYER AT HADNOT POINT ABOUT 220 FEET.

WHAT WOULD PROBABLY -- WHAT COULD POSSIBLY HAPPEI BE IF WE WOULD ADDRESS THE INTERMEDIATE AND DEEP IS YOU START PUMPING OVER TIME AND YOU COULD ACTUALLY DRAW CONTAI DOWNWARD.

GIVEN THAT THE CONTAMINATION LEVELS IN THE INTERI AND DEEP ARE PRETTY LOW TO BEGIN WITH WE FELT THAT WOULD NO THAT WE'D ACTUALLY END UP WITH A WORSE RESULT. SO, THA THAT ALTERNATIVE WASN'T SELECTED. IT'S NOT, YOU KNOW, THEY DON'T FEEL LIKE CLEANING UP THE DEEP AQUIFER. WE FE BEST TO JUST ADDRESS THE SHALLOW, WHICH IS THE HOT SPOT ANI THE SOURCE OF THE DEEP. I MEAN, THE SHALLOW IS THE SO OBVIOUSLY THE DEEP. WE FEEL LET'S CLEAN THAT UP SEE WHAT TO THE LEVELS DOWN BELOW. WHILE WE'RE CLEANING UP THAT AQUIFER OVER TIME AND AT CERTAIN INTERVALS, USUALLY IT'S QI AND THEN SOMETIMES THEY'LL BACK IT OFF TO MAYBE TWICE A WILL TAKE SAMPLES FROM OUR MONITORING WELLS TO SEE HOW E THE SOLUTION IS. WE WILL ALSO TAKE SAMPLES FROM THE DI WANT TO SEE IF OVER TIME THE DEEP AQUIFER IS SLOWLY DECRE CONCENTRATION AS WELL AS THE INTERMEDIATE. WE THINK T HAPPEN OVER TIME IF WE ADDRESS THE SOURCE AREA.

MRS. WOOD: WHERE WOULD THAT WATER IN THE DEEP BE MIGRATING TO?

MR. WATTRAS: IN THE DEEP?

MRS. WOOD: YEAH.

MR. WATTRAS: IT'S HEADING TOWARDS THE NEW RIVER. THE DEEP AQUIFER --

MRS. WOOD: WELL, AT THAT RATE WOULD IT INTERSECT -- ACTUALLY INTERSECT OR IS IT GOING RIGHT OUT INTO THE OCEAN?

MR. WATTRAS: SOME OF IT -- YOU KNOW, AGAIN, THIS CASTLE HAYNE AQUIFER GOES DOWN TO 220 FEET. YOU KNOW, AT A HUNDRED FEET SOME OF THAT GROUNDWATER AS IT HEADS TOWARDS THE NEW RIVER IS GOING TO START GOING UPWARDS TOWARDS THE RIVER. THE WATER AT 220 FEET IS PROBABLY GOING TO GO RIGHT UNDERNEATH THE NEW RIVER.

BY THE WAY, WE HAVE SAMPLED THE NEW RIVER JUST TO SEE IF THERE IS ANY IMPACT. THERE WAS NO VOLATILE CONTAMINATION OF THAT SURFACE WATER. CHANCES ARE AT LEVELS -- AND I MENTIONED BEFORE WE HAD A LITTLE BIT OF BENZENE IN THE DEEP AQUIFER AT ABOUT FIVE PARTS PER BILLION. MY BEST JUDGEMENT WOULD BE THAT ONCE THAT WOULD REACH THE NEW RIVER AND ENTER THE NEW RIVER YOU WOULD NOT EVEN BE ABLE TO MEASURE IT BECAUSE OF DELUSIONAL EFFECTS. THAT WOULD BE -- YOU'D HAVE TO HAVE A PRETTY GOOD SLUG OF GROUNDWATER FOR IT TO ACTUALLY SHOW UP IN THE NEW RIVER; YOU WOULD HAVE A PRETTY GOOD PROBLEM.

COLONEL WOOD: IN YOUR TESTING OF THE NEW RIVER DID YOU FIND ANY METALS THERE?

MR. WATTRAS: WE DO FIND METALS.

COLONEL WOOD: DID YOU FIND MERCURY?

MR. WATTRAS: OH, MERCURY? I DON'T ACTUALLY RECALL. CAN YOU -- I DON'T -- IT DOESN'T RING A BELL.

MR. BIXIE: IT WASN'T ANYTHING THAT WAS ABOVE ANY STANDARDS. I MEAN, YOU ALWAYS FIND VERY, VERY LOW LEVELS OF METALS, BUT NOTHING THAT WAS ABOVE STANDARD.

MR. PAUL: DO YOU ASK THAT FOR ANY SPECIFIC REASON?

COLONEL WOOD: WHAT IT DOES TO THE FISH.

MR. PAUL: WHAT'S THAT?

COLONEL WOOD: WHAT IT DOES TO THE FISH.

MR. PAUL: BUT NO KNOWN PRACTICE THAT YOU KNOW ABOUT?

COLONEL WOOD: NO, NO, NO, NO.

MR. PAUL: THAT WAS THE SITE OF THE AIR STATION THAT WE EXCEPTED TO FIND MERCURY, BUT WE DIDN'T FIND IT.

MR. WATTRAS: YEAH, SAMPLED -- DID YOU ASK ABOUT THE FISH?

COLONEL WOOD: YEAH.

MR. WATTRAS: OKAY. I'M SORRY, I COULDN'T HEAR YOU. YEAH, WE DID --

MR. PAUL: NO, HE JUST SAID WHAT IT DOES

TO THE FISH.

MR. WATTRAS: OH.

MR. PAUL: WHAT IT DOES TO THE FISH.

MR. WATTRAS: OH, I SEE.

MR. PAUL: I DIDN'T KNOW IF THERE WAS SOME HISTORY THERE THAT HE COULD SHED SOME LIGHT ON?

COLONEL WOOD: NO, NOT AT ALL.

MR. WATTRAS: SO, THAT'S THE PROPOSED ALTERNATIVE TO GROUNDWATER. TO SIMPLY -- WE ARE CONTAINING IT AT PRESENT. NOW, WE'RE GOING TO GO OUT TO THE HOT SPOT AND TIE IN WITH THE EXISTING SYSTEM.

I'M GOING TO BACK UP AND GO OVER THE SOIL ALTERNATIVES. WE CAME UP WITH FOUR ALTERNATIVES. OBVIOUSLY, THE NO ACTION ALTERNATIVE IS ALWAYS CONSIDERED. THE SECOND ALTERNATIVE WOULD BE TO LEAVE THE SOIL IN PLACE AND POSSIBLY CAP IT. YOU CAN CAP IT WITH ASPHALT. YOU CAN CAP IT WITH CLAY. YOU CAN CAP IT WITH SOIL, PUT TWO FEET OF SOIL ON IT AND PLANT GRASS. THAT WOULD BE CONSIDERED CAPPING.

THE THIRD ALTERNATIVE IS ON-SITE TREATMENT. THAT WOULD BE EXCAVATION OF THE SOIL, POSSIBLY BRINGING ON -- YOU CAN BRING ON AN INCINERATOR OR ANOTHER TYPE OF TREATMENT TECHNIQUE THAT WOULD BE APPLICABLE TO PESTICIDES AND PCB'S.

THE FOURTH ALTERNATIVE WOULD BE JUST TO EXCAVATE IT AND TO TAKE IT OFF-SITE TO A PERMITTED FACILITY FOR DISPOSAL.

I'LL GO OVER THE COSTS AGAIN; YOU PROBABLY CAN'T SEE

THEM VERY WELL. THE COSTS RANGE ANYWHERE, OBVIOUSLY, FROM ZERO ALL THE WAY UP TO 1.4 MILLION.

1.4 MILLION WOULD BE THE COST OF BRINGING AN ON-SITE INCINERATOR ACTUALLY TO THE BASE. THE REASON IT'S SO HIGH -- I MENTIONED BEFORE ABOUT THE QUANTITIES OF SOIL. WE DON'T REALLY HAVE A -- YOU KNOW, THESE ARE SMALL AREAS. AND HERE'S WHERE YOU RUN INTO THE COST OF, BECAUSE YOU'RE DEALING WITH SUCH A SMALL AMOUNT OF SOIL, IT REALLY DOES NOT MAKE IT COST-EFFECTIVE TO BRING A TREATMENT SYSTEM ON-SITE, BECAUSE OF ALL THE CAPITAL COSTS ASSOCIATED WITH JUST A SMALL AMOUNT OF SOIL. THAT'S WHY THE COST IS SO HIGH; IT'S REALLY NOT THAT COST-EFFECTIVE TO DO ON-SITE TREATMENT FOR SUCH A SMALL COST OF SOIL.

NOW, MAYBE IF YOU HAD A PROBLEM WHERE YOU HAD A VERY LARGE AREA OF SOIL CONTAMINATION, THAT MIGHT BE FEASIBLE, INSTEAD OF EXCAVATING AND TRUCKING EVERYTHING OFF-SITE FOR TREATMENT OR FOR OFF-SITE DISPOSAL, THAT MIGHT BE A CASE WHERE IT'S MORE FEASIBLE TO SAY LET'S BRING THE TREATMENT SYSTEM ON-SITE, BECAUSE WE HAVE PLENTY OF SOIL AND IT'S GOING TO BE COST-EFFECTIVE.

SO, THERE'S A LITTLE BIT OF -- THE LESS CONTAMINATION YOU HAVE, IT SEEMS LIKE THE MORE EXPENSIVE IT IS TO BRING THE TREATMENT ON-SITE. THAT MIGHT NOT -- NOW, FOR PETROLEUM -- AGAIN, WE'RE TALKING PESTICIDES AND PCB'S. LAST NIGHT WE TALKED ABOUT THE PETROLEUM PRODUCT. THAT'S A LITTLE BIT DIFFERENT. IT'S A LOT EASIER TO TREAT, TOO.

PESTICIDES AND PCB'S, THERE AREN'T THAT MANY TREATMENT

TECHNOLOGIES IN DEALING WITH THEM. YOU'RE ALMOST LIMITED TO -- INCINERATION IS PROBABLY THE MOST NOTED AND THE LEAST AMOUNT OF RISK WE KNOW THAT IT'S GOING TO GET RID OF IT. THERE ARE SOME OTHER TECHNOLOGIES THAT ARE WHAT THEY CALL INNOVATIVE, AND THEY HAVE MORE RISKS. YOU WON'T BE -- THERE IS --

MRS. WOOD: DEFINE "INNOVATIVE"?

MR. WATTRAS: FOR EXAMPLE --

MRS. WOOD: DEFINE IT.

MR. BIXIE: SOIL WASHING.

MR. WATTRAS: SOIL WASHING. THEY CAN ADD SOME -- I WANT TO -- ACTUALLY LIKE A SOLVENT TO THE SOIL TO EXTRACT THE PCB'S OR PESTICIDES. THEN, ALL THOSE PCB'S AND PESTICIDES ARE --

MRS. WOOD: YOU STILL HAVE THEM.

MR. WATTRAS: -- IN THE SOLVENT, AND THEN THEY WOULD JUST GET RID OF THE SOLVENT, AND THE SOIL WOULD BE USED AS BACK FILL.

SO, THE COST RANGE, AGAIN, THIS IS -- THAT ONE ON-SITE TREATMENT -- THIS IS A TYPOGRAPHICAL ERROR. THE COSTS RANGE FROM $650,000 TO 1.4 MILLION.

FOR THE OFF-SITE DISPOSAL, THE COSTS WOULD RANGE FROM $480,000 UP TO 1.3 MILLION. THE REASON IS $480,000 REPRESENTS TAKING IT OFF-SITE AND TAKING IT TO A PERMITTED LANDFILL. THE 1.3 MILLION DOLLAR RANGE REPRESENTS TAKING IT OFF-SITE, TREATING IT VIA INCINERATION.

NOW, THE SOIL -- THERE'S OUR TREATMENT SYSTEM, BY THE WAY. WE CAN TALK ABOUT THAT LATER ON.

THE PROPOSED ALTERNATIVE FOR SOIL IS TO CHOOSE ALTERNATIVE FOUR AND SIMPLY EXCAVATE THE SOIL AND TAKE IT TO AN OFF-SITE LANDFILL. IN THIS CASE -- IT HAS A LOT TO DO WITH THE QUANTITY OF SOIL. WE'RE NOT TALKING HIGH QUANTITIES OF SOIL. IN THIS CASE, IT'S MOST FEASIBLE TO JUST TAKE IT TO AN OFF-SITE LANDFILL. THE PESTICIDE AND PCB CONTAMINATED SOIL IS NOT CONSIDERED A HAZARDOUS WASTE. IT'S CONSIDERED -- IT HAS HAZARDOUS SUBSTANCES IN IT, BUT IT DOES NOT FALL UNDER THE CATEGORY OF HAZARDOUS WASTE.

ONCE A SOIL OR A LIQUID FALLS UNDER THE CATEGORY OF A HAZARDOUS WASTE, IT HAS TO GO TO A VERY SPECIAL TYPE OF LANDFILL, AND THAT DOES RUN INTO A LOT OF MONEY. IN THIS CASE, BECAUSE IT'S NOT HAZARDOUS, IT COULD BE TAKEN TO A PERMITTED, WHAT THEY CALL A TITLE C LANDFILL, IF I'M NOT MISTAKEN. BUT IT COULD BE TAKEN TO A LANDFILL THAT DOES NOT -- IT HAS A LOT OF PRECAUTIONS, YOU KNOW, IT'S NOT JUST A DUMP.

MS. WOOD: IT'S LINED.

MR. WATTRAS: BUT IT'S DIFFERENT THAN A HAZARDOUS WASTE LANDFILL AND IT BECOMES MORE COST-EFFECTIVE JUST TO TAKE THIS PESTICIDE AND PCB SOIL TO AN OFF-SITE LANDFILL.

THAT'S THE CONCLUSION OF THE HADNOT POINT PROPOSED ALTERNATIVES.

WE'RE GOING TO TALK ABOUT ANOTHER OPERABLE UNIT. BUT

BEFORE WE GET INTO THAT, ARE THERE ANY OTHER QUESTIONS THAT YOU MIGHT HAVE THAT YOU WANT TO TALK ABOUT NOW OR -- WE COULD -- WE CAN ADDRESS THEM.

MRS. WOOD: JUST, IN OTHER WORDS, YOU'RE CONCENTRATING ON THE WATER AND THE SOILS THAT ARE CONTAMINATED WITH THE PESTICIDES.

MR. WATTRAS: RIGHT, PESTICIDES AND PCB'S.

MRS. WOOD: THERE'S NO PROBLEMS WITH PETROLEUM PRODUCTS --

MR. WATTRAS: NO, THAT --

MRS. WOOD: -- OR SOLVENTS?

MR. WATTRAS: THAT WAS NOT INCLUDED AS PART OF THIS STUDY. YOU'RE TALKING ABOUT SITE 22 OR?

MRS. WOOD: WELL, I MEAN -- YEAH, OR UP THERE BY BUILDING 900, THERE'S NO GROUND PROBLEM?

MR. WATTRAS: OH, NO. NO, NO, NO. AGAIN, WE LOOKED AT THOSE SOIL RESULTS. THAT'S WHAT I WAS SAYING BEFORE, WHERE WE REALLY DIDN'T SEE VERY HIGH LEVELS OF SOLVENTS THAT WE COULD ASSOCIATE WITH A CONTINUING SOURCE.

IF WOULD HAVE, AND THAT WOULD HAVE, YOU KNOW -- THAT WOULD HAVE BEEN A GREAT THING TO SAY THAT THERE'S STILL A SOURCE THERE AND WE'RE GOING TO DO SOMETHING WITH IT. BUT IF WE WOULD HAVE FOUND SOME VERY HIGH LEVELS OF SOLVENTS IN SOILS THAT ARE ASSOCIATED WITH THAT PLUME, THEY WOULD HAVE BEEN TAKEN CARE OF. I MEAN, WE WOULD -- I DON'T BELIEVE --

MRS. WOODS: SO, IT'S JUST THE PLUME.

MR. WATTRAS: -- A SOURCE WOULD HAVE BEEN LEFT THERE. I DON'T BELIEVE EPA OR THE STATE WOULD HAVE EVER PERMITTED A SOURCE OF CONTAMINATION TO THE SOIL TO REMAIN THERE. IT CERTAINLY WOULD HAVE BEEN ADDRESSED. BUT IT APPEARS THAT THE SOURCE HAS BEEN DEPLETED FROM THAT SOIL MATRIX AT THIS TIME AND IS PRETTY MUCH SITTING IN THE SHALLOW GROUNDWATER.

OKAY. OPERABLE UNIT NUMBER FIVE IS A VERY SMALL OPERABLE UNIT. IT CONSISTS OF ONE SITE: SITE TWO. SITE TWO IS CALLED THE FORMER NURSERY DAY CARE CENTER. IT INVOLVES TWO AREAS; ONE IS -- WE CALL THE BUILDING 712 AREA. THAT WAS THE BUILDING THAT USED TO HOUSE THE PESTICIDES AND STORED THEM. AND WE HAVE ANOTHER AREA CALLED THE FORMER STORAGE AREA. THIS IS ACROSS A SET OF RAILROAD TRACKS THAT WAS ONCE OPENED -- THAT'S AN OPEN FIELD THAT WAS ONCE USED TO STORE BULK MATERIALS.

THIS IS A PICTURE OF BUILDING 712, AND BEHIND IT THAT'S A PARKING LOT AREA. IT'S CURRENTLY USED AS AN ADMINISTRATIVE OFFICE. AND I CAN SHOW YOU ON ANOTHER SLIDE, BUT OVER IN THIS AREA, THERE ARE TWO CONCRETE PADS, CEMENT PADS OR CONCRETE PADS, WHICH WE BELIEVE THEY USED TO STORE DRUMS OF PESTICIDES. WE LOOKED AT SOME AERIAL PHOTOGRAPHS WHERE WE COULD SEE THESE DRUMS OF PESTICIDES SITTING ON THESE PADS. AND THEY PROBABLY, YOU KNOW -- THEY WERE 55 GALLON DRUMS THAT WERE TURNED ON THEIR SIDE. THEY PROBABLY HAD THE SPIGOT THERE AND WOULD POUR OUT THE PESTICIDES AS THEY NEED THEM AND FILL UP THEIR SPRAYERS AND APPLY THEM.

COLONEL WOOD: DID THEY OPERATE THOSE PADS COINCIDENTALLY WITH THE -- OR AT THE SAME TIME THAT THE PLACE WAS OPERATING AS A DAY CARE CENTER?

MR. WATTRAS: AS FAR AS I KNOW, NO.

MR. HAVEN: NO, SIR.

MR. PAUL: NO, SIR.

MR. HAVEN: AS A MATTER OF FACT, SITE TWO, IF I'M NOT MISTAKEN, WAS OPERATING FROM 1945 TO 1958 AS A PESTICIDE MIXING AREA. AND THE DAY CARE CENTER WAS PROBABLY A COUPLE OF DECADES LATER.

MRS. WOOD: OH, NO. NO.

MR. HAVEN: IT CAME ABOUT THE '60S.

MRS. WOOD: NO, THAT CAME ABOUT -- YEAH, IT WAS THERE FOR YEARS BEFORE YOU WERE BORN REALLY. I HAD IT IN HERE, BUT IT CAME IN SHORTLY AFTER '58.

MR. HAVEN: IN THE '60S.

MRS. WOOD: AND THEY CLOSED IT DOWN IN THE '70S, '78 OR SOMETHING LIKE THAT.

MR. WATTRAS: I THINK IT'S ONE ON OF THOSE SLIDES. LET ME SEE. FROM 1945 TO 1958 IS WHAT WE HAVE THROUGH OUR RECORDS OR IN LOOKING AT INFORMATION, THAT'S WHEN IT OPERATED.

MRS. WOOD: THE DAY CARE CENTER WENT IN ALMOST IMMEDIATELY AFTER THAT.

MR. PAUL: I WANT TO SAY '63 FOR THE DAY CARE.

MRS. WOOD: THAT SOUNDS AWFULLY CLOSE.

MR. PAUL: YEAH, IT WAS IN THE EARLY '60S, BUT I DON'T THINK IT WAS A YEAR OR TWO AFTER.

MRS. WOOD: THEY DIDN'T MOVE ONE OUT AND PUT ONE IN.

MR. WATTRAS: THESE ARE THE CONCRETE PADS. THE OBJECT IN THE BACKGROUND IS A MONITORING WELL WHICH WE INSTALLED. ON THE OTHER SIDE OF THE MONITORING WELL RIGHT UP HERE IS ANOTHER CONCRETE PAD. SO, WE HAVE A MONITORING WELL RIGHT IN THE MIDDLE OF THIS AREA.

WE TOOK A LOT OF SAMPLES THROUGHOUT HERE, A LOT OF SOIL SAMPLES. WE STARTED AT THE SURFACE AND WORKED OUR WAY DOWN TO THE WATER TABLE, WHICH IS PROBABLY ABOUT SIX OR SEVEN FEET UP HERE. AND WE ALSO LOOKED AT THE OTHER AREA AROUND THE BUILDING, JUST TO MAKE SURE, YOU KNOW, THERE WEREN'T HIGH LEVELS OF PESTICIDES BACK THERE.

THIS IS THE SECOND PAD THAT I WAS SHOWING YOU IN THAT PREVIOUS FIGURE. THIS PAD'S PRETTY --

MRS. WOOD: NOW, IS THAT A DITCH OVER THERE TO THE RIGHT?

MR. WATTRAS: YES, THERE IS A DRAINAGE DITCH, AND THERE'S A SET OF -- THERE'S RAILROAD TRACKS THAT RUN IN THIS DIRECTION. AND THAT DRAINAGE DITCH RECEIVES SURFACE RUN-OFF. RARELY IS THERE WATER IN THAT DITCH EXCEPT AFTER A RAINFALL. SO, IT'S NOT AN INTERMITTENT STREAM; IT'S SIMPLY A DITCH.

THIS IS THE OPEN AREA, THE STORAGE AREA, I WAS TALKING ABOUT. NOW, TYPICALLY IT'S JUST AN OPEN FIELD. THE EQUIPMENT YOU SEE HERE WAS ASSOCIATED WITH OUR INVESTIGATION. BUT TYPICALLY, THERE'S NOTHING THERE. IT'S JUST AN OPEN FIELD. LOOKING AT HISTORICAL PHOTOGRAPHS -- IN FACT, I BELIEVE THERE'S ONE OVER THERE -- YOU CAN SEE THAT THERE USED TO BE, COMING OFF THAT TRAIN TRACK -- NOW, THE TRAIN TRACKS ARE RUNNING RIGHT OVER HERE, OKAY? BUILDING 712 IS ON ONE SIDE. THIS OPEN FIELD'S ON THE OTHER. THERE USED TO BE A RAILROAD SPUR THAT CAME OFF OF THE MAIN LINE, AND YOU CAN SEE THINGS THAT WERE STORED OVER HERE AT ONE TIME. NOW, THAT RAILROAD SPUR IS GONE AND, AGAIN, NOTHING'S STORED THERE.

TO BE QUITE HONEST WITH YOU, THERE'S NO INFORMATION TELLING US WHAT WAS STORED THERE. YOU CAN SEE OBJECTS IN THE HISTORICAL PHOTOGRAPHS, BUT WE LOOKED THROUGH DIFFERENT RECORDS TO SEE IF -- WHAT MIGHT HAVE BEEN STORED THERE. THERE IS A WATER TREATMENT FACILITY ON THE OTHER SIDE OF THIS ROAD, RIGHT OVER HERE. IT COULD HAVE BEEN -- THE STUFF THAT WAS STORED OVER THERE COULD HAVE BEEN ASSOCIATED WITH THAT TREATMENT FACILITY FOR ALL WE KNOW. BUT WE DON'T HAVE ANY INFORMATION ON EXACTLY WHAT WAS STORED THERE.

STUDIES HAVE BEEN CONDUCTED OUT HERE BEFORE WE DID OUR REMEDIAL INVESTIGATION. I BELIEVE THERE WERE FIVE MONITORING WELLS ALREADY IN PLACE. FOUR OF THE MONITORING WELLS WERE LOCATED AROUND THE BUILDING 712 AREA. AND THE FIFTH MONITORING WELL WAS

IN THIS OPEN FIELD AREA.

WHAT WE FOUND -- OBVIOUSLY WE FOUND A LOT OF PESTICIDES IN THE SURFACE SOIL AND THE SEDIMENT NEAR THE CEMENT PADS, VERY HIGH LEVELS. THE HIGHEST LEVEL WAS ABOUT ONE MILLION PARTS PER BILLION. WE'RE TALKING PERCENTAGE, SO VERY HIGHLY CONCENTRATED SOIL -- OR PESTICIDE LEVELS IN THE SOIL; AS WELL AS THE SEDIMENT IN THE DRAINAGE DITCH, WHICH MAKES SENSE BECAUSE IT'S A PRETTY STEEP DITCH, AND I'M SURE THROUGH RUNOFF A LOT OF STUFF FLOWS RIGHT INTO THAT DITCH.

WITH RESPECT TO GROUNDWATER, WE REALLY DIDN'T FIND MUCH OF A PESTICIDE PROBLEM. WE DID HAVE SOME LOW LEVELS. THE WELL IN BETWEEN THE PADS HAD SOME VERY, VERY LOW LEVELS. I LIKE TO CALL THEM TRACE LEVELS; WE'RE TALKING VERY LOW PARTS PER BILLION. BUT THE MAJOR PROBLEM, WITH RESPECT TO GROUNDWATER, HAPPENED TO BE SOME LEVELS OF ETHYLBENZENE AND XYLENE IN THE FORMER STORAGE AREA.

I MENTIONED JUST A BIT AGO WE HAD ONE WELL OVER IN THE FORMER STORAGE AREA. AND HISTORICALLY, BACK IN THE MID-80S WHEN THAT WELL WAS FIRST INSTALLED, IT HAD SOME LOW LEVELS OF ETHYLBENZENE AND XYLENE, AND THAT WELL'S BEEN SAMPLED ABOUT THREE OR FOUR TIMES, AND THE CONTAMINANTS KEEP SHOWING UP AT SLIGHTLY LOWER LEVELS.

WE LOOKED FOR THE SOURCE OF ETHYLBENZENE AND XYLENE; WE KNOW THOSE ARE ASSOCIATED WITH PETROLEUM PRODUCTS, GASOLINE OR WHATEVER, DIESEL FUEL. WE THOUGHT MAYBE THERE WAS AN UNDERGROUND STORAGE TANK OVER THERE THAT NOBODY KNEW ABOUT. SO, WE LOOKED AT

THAT, WE DID SOME GEOPHYSICAL WORK TO SEE IF WE COULD SEE A TANK; NOTHING CAME UP.

WE DID SOME EXTENSIVE SAMPLING IN THE FORMER STORAGE AREA THINKING THAT WE'RE GOING TO HIT SOME KIND OF SPILL AREA THAT WOULD HAVE, YOU KNOW, ETHYLBENZENE AND ALL THESE OTHER PRODUCTS, BUT WE REALLY DIDN'T FIND THE SOURCE OF THIS ETHYL BENZENE AND XYLENE.

LET ME TELL YOU ABOUT THE LEVELS JUST A LITTLE BIT MORE. WE ARE TALKING ABOUT LOW LEVELS OF ETHYLBENZENE AND XYLENE. THEY ARE BELOW WHAT'S CALLED FEDERAL DRINKING WATER STANDARDS. BUT THEY ARE ABOVE THE STATE'S DRINKING WATER STANDARDS. THE STATE'S STANDARDS ARE A LITTLE BIT MORE STRICTER THAN THE FEDERAL STANDARDS (SIC).

THE EXTENT OF THAT CONTAMINATION IS DEFINED. IT'S A VERY SMALL PLUME. WE HAVE WELLS -- WE HAVE A LOT OF WELLS. AT ONE TIME I MENTIONED THERE WERE FIVE WELLS WHEN WE STARTED. I THINK WE'RE UP TO ABOUT 13 WELLS OR 12 WELLS. WE HAVE A PRETTY GOOD IDEA. WE LOOKED AT THE DEEP GROUNDWATER RIGHT BELOW THAT ETHYLBENZENE PLUME, AND WE DIDN'T FIND ANY ETHYLBENZENE OR XYLENE IN THE DEEP GROUNDWATER. SO, WE KNOW IT'S A SMALL LOCALIZED GROUNDWATER PROBLEM.

TALKING ABOUT THE FINDINGS A LITTLE BIT, I PROBABLY WENT OVER MOST OF THIS, JUMPING AHEAD OF MYSELF. I WILL SAY ANOTHER THING, BY THE CEMENT PAD AREA, WE ALSO FOUND SOME SEMI-VOLATILE ORGANICS LIKE NAPHTHALENE. AGAIN, AT ONE TIME THESE PESTICIDES

WERE APPLIED WITH A PETROLEUM-BASED SOLVENT, SO SEEING THINGS LIKE NAPHTHALENE, NAPHTHALENE IS A CONTAMINANT THAT'S ASSOCIATED WITH PETROLEUM. IF THEY USED PETROLEUM-BASED SOLVENTS TO MIX WITH THE PESTICIDES TO APPLY IT, IT MAKES SENSE THAT WE WOULD FIND SOME OF THESE COMPOUNDS IN THAT SEDIMENT OR IN THE SOIL AND SEDIMENT.

THAT'S PRETTY MUCH JUST WHAT I JUST MENTIONED. LOW LEVELS OF XYLENE AND ETHYLBENZENE ABOVE THE STATE STANDARDS, BUT BELOW FEDERAL STANDARDS. I MENTIONED SOME PESTICIDES IN GROUNDWATER, EVEN OUR UPGRADIENT WELL, FOR WHATEVER REASON, HAD SOME LOW LEVELS OF PESTICIDES. AGAIN, THESE LOW LEVELS COULD HAVE BEEN DUE, PRETTY MUCH THE SAME SITUATION WHERE I TALKED BEFORE ABOUT SITE 24 WHERE YOU START GETTING SOME PARTICULATES INTO THE SAMPLE, ESPECIALLY IN OUR BACKGROUND WELL. WE WERE A LITTLE BIT SURPRISED.

WE HAD THE SAME PROBLEM WITH LEAD AND -- METALS SUCH AS LEAD, CADMIUM AND CHROMIUM IN OUR GROUNDWATER. AND THIS GOES BACK TO THE WHOLE DISCUSSION WE HAD PREVIOUSLY, AND WE EVEN INCLUDED ON THERE INCLUDING OUR UPGRADIENT WELL. AGAIN, WE'RE NOT SO SURE WHETHER THESE METALS WERE REALLY ASSOCIATED WITH THE SITE OR NOT. WE REALLY BELIEVE THEY ARE NOT.

WITH RESPECT TO DISSOLVED METALS, MANGANESE WAS THE ONLY CONTAMINANT WHICH EXCEEDED WATER STANDARDS. IT EVEN EXCEEDED IT IN OUR UPGRADIENT WELL, AND AS WE KNOW, I THINK THROUGHOUT THIS REGION, MANGANESE SEEMS TO BE EVERYWHERE, REGARDLESS IF IT'S ON-SITE OR OFF-SITE.

DEEP GROUND WATER; SURPRISINGLY, OUR DEEP WELL, WE WERE LOOKING FOR ETHYLBENZENE, BECAUSE WE WERE INTERESTED IN -- WE HAVE A SHALLOW GROUNDWATER PROBLEM. WE WERE INTERESTED TO SEE HOW FAR DOWN THESE CONTAMINANTS MIGRATE. WE ACTUALLY PICKED UP VERY LOW LEVELS OF TCE IN THE WELL, WHICH WAS SURPRISING BECAUSE THIS SITE, ALL THE SOIL SAMPLES THAT WE'VE TAKEN, ALL THE OTHER MONITORING WELLS HAD NO TCE IN IT. WE FOUND VERY LOW LEVELS OF TCE. SO, WE RE-SAMPLED THE WELL; THE SECOND ROUND WE DIDN'T HAVE IT. NOW, THAT'S NOT UNCOMMON WHEN YOU GET TO LOW LEVELS. IT IS UNCOMMON IF, FOR EXAMPLE, THE FIRST ROUND YOU HAVE 1,000 MICROGRAMS PER LITER, AND THEN THE SECOND TIME YOU SAMPLED IT YOU DIDN'T FIND IT. THAT'S UNUSUAL; SOMETHING'S WRONG THERE. WHEN YOU'RE AT SUCH A LOW LEVEL, FIVE PARTS PER MILLION, THAT'S VERY, VERY LOW TO BEGIN WITH. SO, CAN'T SAY THERE ISN'T ANYTHING THERE, BUT WE'RE SAYING IT'S A PRETTY SMALL PROBLEM. AND AGAIN, WE DON'T BELIEVE IT'S ATTRIBUTABLE TO SITE TWO BASED ON THE DATA THAT WE HAVE OF THIS SITE AND BASED ON THE HISTORY OF THIS SITE, KNOWING IT WAS USED FOR A PESTICIDE STORAGE AREA.

MRS. WOOD: THERE ARE NO WELLS -- WATER WELLS IN THE AREA?

MR. WATTRAS: THERE ARE WATER WELLS, NOT IN THE IMMEDIATE AREA OF SITE TWO. THERE ARE WELLS WITHIN A MILE OF SITE TWO THAT ARE OPERATING AND ARE CLEAN, BUT NOT WITHIN THE IMMEDIATE SITE TWO AREA.

WHILE WE WERE DOING THIS STUDY, WE WERE GETTING THE

RESULTS IN FROM THE LABORATORY. WE WERE SEEING THESE VERY HIGH LEVELS OF PESTICIDES. WE TALKED TO THE DEPARTMENT OF THE NAVY AND MARINE CORPS, AND WE ALERTED THEM THAT, LOOK, WE HAVE SOME -- WE HAVE A MAJOR PROBLEM WITH THE SOIL.

THE NAVY AND MARINE CORPS DECIDED TO "LET'S GET RID OF THE SOILS NOW. LET'S NOT WAIT UNTIL THE STUDY IS OVER. LET'S DO SOMETHING NOW."

SO, THEY DID WHAT'S CALLED A TIME CRITICAL REMOVAL ACTION. THEY WENT IN AND THIS IS BEING DOWN RIGHT NOW IN FACT. THEY'RE EXCAVATING AS WE SPEAK. THERE'S A HOLE IN THE GROUND OUT AT SITE TWO.

THEY DECIDED, "LET'S NOT WAIT FOR THE CLEANUP. WE KNOW WE HAVE A PROBLEM THAT WE'RE GOING TO HAVE TO DEAL WITH. WHY WAIT TO THE END OF THE STUDY TO DEAL WITH IT? LET'S GET RID OF IT NOW." ESPECIALLY IN LIGHT OF THE FACT THAT THE BUILDING IS BEING USED AS AN ADMINISTRATIVE OFFICE.

SO, THAT'S GOING ON RIGHT NOW. AND THAT HAPPENS -- I MEAN, THAT HAPPENS A LOT. IT'S NOT A BAD THING TO DO. IF YOU KNOW YOU HAVE A PROBLEM, WHY WAIT ANOTHER YEAR OR TWO TO COMPLETE A STUDY, WHEN AT THE END OF THE STUDY YOU KNOW YOU'RE GOING TO HAVE TO ADDRESS THAT PROBLEM. IT REALLY MAKES SENSE TO DEAL WITH THE PROBLEM NOW.

THAT'S BEEN THE WAVE OF THINGS, NOT ONLY IN THE DEPARTMENT OF DEFENSE, BUT PRETTY MUCH THROUGHOUT THE INDUSTRY, IS "LET'S NOT WAIT FOR THE END OF THESE STUDIES. WE'LL DEAL WITH THE

OBVIOUS PROBLEM FIRST, THEN WE'LL WRAP UP ANYTHING IN THE FINAL STUDY, AND WE'LL DEAL WITH THE RESIDUAL PROBLEM." SAY, IF IT WAS A GROUNDWATER PROBLEM. YOU KNOW, THERE'S NO RISK TO THE GROUNDWATER, BUT WE'LL DEAL WITH THAT AT THE END OF THE STUDY. LET'S DEAL WITH THE PART THAT MIGHT ACTUALLY HAVE A RISK AS WE SPEAK.

THAT'S JUST THE PAD. CLEANUP IS CURRENTLY UNDERWAY, AS I SAID. IT'S INVOLVING APPROXIMATELY 500 CUBIC YARDS OF PESTICIDE CONTAMINATED SOIL. I BELIEVE THEY ARE TAKING THAT SOIL OFF-SITE TO AN INCINERATOR. IS THAT CORRECT, NEAL?

MR. PAUL: RIGHT.

MRS. WOOD: WHERE IS THE INCINERATOR?

MR. PAUL: IN KENTUCKY.

MRS. WOOD: IN KENTUCKY?

MR. PAUL: ACTUALLY, WE ARE EXCAVATING ALL THE SOIL AND ARE WAITING FOR CONFIRMATION OF THE SAMPLES BACK TO MAKE SURE WE HAVE EXCAVATED ALL WE NEED TO DO. HOPEFULLY WE WILL BE CLOSING THAT JOB OUT. I ANTICIPATE HOPEFULLY NEXT WEEK WE CAN GO IN AND PUT CLEAN BACK FILL BACK INTO IT.

MRS. WOOD: IS BASE EQUIPMENT DOING THIS?

MR. PAUL: NO, OHM IS DOING IT.

MRS. WOOD: OHM.

MR. PAUL: INTERESTINGLY ENOUGH, I'VE HAD QUITE A FEW CALLS FROM OTHER CONTRACTORS ON THIS JOB, WANTING TO KNOW HOW THEY COULD GET INVOLVED IN CONSTRUCTING, AND WE'RE TRYING

TO GET SOME OF THAT BUSINESS BACK IN NORTH CAROLINA. I'VE GIVEN THEM THE PROJECT FOR OHM -- I'VE GIVEN THEM THEIR PHONE NUMBER TO CONTACT THEM. BECAUSE THEY DID NOT USE A NORTH CAROLINA CONSTRUCTION COMPANY. SO, HOPEFULLY WE CAN BRING SOME OF THAT BUSINESS BACK INTO ONSLOW COUNTY AND THE STATE OF NORTH CAROLINA.

MRS. WOOD: I MEAN, THEY HAD TO HAVE THE SPECIFIC SITE, ANYTHING THAT'S RUN AROUND THIS --

MR. PAUL: TRIPLE ACTION ALSO WANTS IT BECAUSE THEY'RE CAPABLE OF CARRYING MAYBE 20 CUBIC YARDS.

MR. WATTRAS: I'M SURE THEY HAVE A WEIGHT RESTRICTION, YOU KNOW?

MR. PAUL: WHAT'S THAT?

MR. WATTRAS: I WAS GOING TO SAY ABOUT 15 CUBIC YARDS.

MR. PAUL: YEAH. YOUR BASIC DUMP TRUCK CAN CARRY NINE.

MRS. WOOD: NOW, THAT WOULD HAVE TO BE COVERED, WOULDN'T IT?

MR. PAUL: OH, YEAH.

MR. WATTRAS: OH, YEAH. I'M SURE THEY ARE.

MR. PAUL: AND WE WEIGH THEM ON BASE TO INSURE THAT --

MRS. WOOD: AND THEN THEY WEIGH IT OUT.

MR. PAUL: THEN THEY WEIGH IT OUT TO MAKE SURE WE'RE NOT PAYING FOR ANYMORE THAN WHAT WE'RE ACTUALLY

GETTING.

MRS. WOOD: SO THEY DON'T STOP OFF AND DUMP IT TO SAVE GAS.

MR. PAUL: EVEN THOUGH IT'S NON-HAZARDOUS, YOU STILL MANIFEST IT TO INSURE THAT IT DOES GET SOME DISPOSABILITY.

MR. WATTRAS: NOW, WITH RESPECT TO THE RISK ASSESSMENT, WE LOOKED AT TWO SCENARIOS. SINCE WE KNEW THERE WAS REMOVAL ACTION TAKING PLACE, WE SAID WHAT WOULD BE THE RISK FOLLOWING THE REMOVAL OF THE SOIL, BECAUSE AS I MENTIONED, WE WERE GOING AFTER THE OBVIOUSLY PROBLEM, BUT WE HAVE TO FIGURE OUT IN THE TOTAL SCHEME OF THINGS, IS THERE GOING TO BE SOME RISK EVEN AFTER REMOVING THE SOIL, BECAUSE WE'RE ONLY ADDRESSING THE HOT SPOT, AND IT'S PRETTY WELL DEFINED.

WE ALSO LOOKED AT WHAT WOULD BE THE RISK WITHOUT REMOVING THE SOIL. ALTHOUGH WE KNEW THEY WERE REMOVING IT, WE WANTED TO MAKE A COMPARISON OF WHAT IS THE REAL IMPACT OF DOING THIS.

SO, HUMAN HEALTH LOOKED AT, BEFORE THIS REMOVAL ACTION, AND IT WAS PRETTY OBVIOUS THAT IF THE SOIL SEDIMENTS WEREN'T REMOVED, THERE WOULD BE WHAT WE WOULD CONSIDER AN UNACCEPTABLE RISK FOR THOSE PEOPLE THAT WOULD, YOU KNOW, BE WORKING IN THE AREA OR WHATEVER. THERE WAS A HIGH RISK.

BUT AFTER THE SOIL IS REMOVED -- NOW, WHEN WE DO THIS STUDY, WE KNOW A CERTAIN AREA IS GOING TO BE REMOVED AND WE THROW

OUT THOSE RESULTS. OKAY. NOW, WE LOOK AT WHAT'S THE OTHER CONCENTRATIONS OF THE CONTAMINANTS IN THE AREA. WE HAD, WITHIN THE OTHER PARTS OF THE LAWN, WE HAD SOME PESTICIDES AT WHAT I WOULD CALL TYPICAL LEVELS THAT YOU FIND THROUGHOUT LEJEUNE. I KNOW YOU'VE HEARD ME TALK ABOUT OUR PESTICIDES THROUGHOUT CAMP LEJEUNE THAT I SAID IF I SEE SOMETHING WITH 10 OR 50 PARTS PER BILLION, I REALLY DON'T RAISE AN EYEBROW, BECAUSE I SEE THAT EVERYWHERE. YOU KNOW, THAT DOESN'T TELL ME THAT THERE'S A SOURCE.

SO, THROUGHOUT THE LAWN AREA, AND EVEN IN SOME OF THE BACKGROUND SAMPLES, WE HAVE SOME LOW LEVELS OF PESTICIDES. WELL, WHEN WE USE THAT DATA IN THE RISK ASSESSMENT AFTER REMOVING THIS HOT SPOT; THERE IS NO UNACCEPTABLE HEALTH RISK. EVERYTHING, YOU KNOW, PUTTING CLEAN SOIL BACK IN THE HOLE, REGRADING IT, THERE IS NO UNACCEPTABLE HEALTH RISK AFTER THIS HOT SPOT IS REMOVED.

COLONEL WOOD: WHO ASSUMES RESPONSIBILITY FOR LOOKING INTO THE WELFARE OF THE PEOPLE WHO MAY HAVE BEEN EXPOSED OVER THE YEARS WHILE THEY WERE OUT THERE?

MR. HAVEN: A LOT OF WHAT WENT ON THERE WAS THERE WERE DIFFERENT RISK ASSESSMENTS DONE LIKE HEALTH RISK ASSESSMENT TO HUMAN RECEPTORS IS --

MR. BIXIE: AS I HAD MENTIONED BEFORE AN AGENCY FOR TOXIC SUBSTANCES HAS ALSO TAKEN THAT INTO ACCOUNT AND THEY'RE CONDUCTING A PROGRAM.

COLONEL WOOD: DO THEY HAVE ACCESS?

MR. HAVEN: EVERYTHING -- ALL THE

INFORMATION THEY HAVE REQUESTED THEY FORWARD TO US AND WE'RE WORKING WITH MANPOWER, FOR EXAMPLE, BASE HOUSING TO GET THEM ALL THE INFORMATION THAT THEY WANT. THEY HAVE ALSO GONE THROUGH, I BELIEVE, SOME MEDICAL RECORDS AND THINGS LIKE THAT TO GET MORE INFORMATION, AND THEY ARE ESSENTIALLY LOOKING AT THAT POSSIBILITY.

COLONEL WOOD: DO YOU KEEP THAT --

MR. HAVEN: NO, SIR.

COLONEL WOOD: WILL THEY USE THE FACILITY?

MR. HAVEN: HERE AGAIN, THE ATSTR MANAGER -- BASICALLY BEFORE WE PUT IN MANPOWER, BASE HOUSING --

COLONEL WOOD: DOES ATSTR SAY THEY HAVE THE RESPONSIBILITY FOR IT?

MR. HAVEN: YES, SIR. THEY'D HAVE RESPONSIBILITY FOR IT.

MR. WATTRAS: SEE, THAT'S THE MAIN DIFFERENCE. I BELIEVE LAST NIGHT YOU ASKED A QUESTION ABOUT ATSTR AND THE RISK ASSESSMENT THAT THEY DO. AS I SEE IT, HERE'S THE DIFFERENCE: WHEN WE DO A RISK ASSESSMENT UNDER CERCLA, WE LOOK AT WHAT'S THE CURRENT RISK AND WHAT'S THE FUTURE RISK.

ATSTR, THEY GET INTO THE MORE OF THE -- THOSE F.D. STUDIES, WHAT ARE THEY CALLED? WHATEVER THEY'RE CALLED. THEY WILL DO THAT. THAT'S THE MAIN DIFFERENCE. THEY LOOK AT LOOKING AT BIRTH DEFECTS OR WHATEVER. WE DON'T DO THAT UNDER OUR RISK ASSESSMENT. THAT'S -- WE LOOK AT CURRENT SITUATION. WE DON'T LOOK AT THE PAST. THAT IS PART OF THEIR MISSION. THEY WILL AT

WHAT HAS HAPPENED IN THE PAST AND LOOKING FOR TRENDS IN CANCER IN THE AREA, OR BIRTH DEFECTS OR THINGS LIKE THAT. THAT'S THE MAIN DIFFERENCE IN OUR RISK ASSESSMENT AND THEIR PUBLIC HEALTH ASSESSMENT. IT'S EITHER CALLED -- IT'S CALLED A PUBLIC HEALTH ASSESSMENT, WHEREAS OURS IS CALLED A RISK ASSESSMENT, A HUMAN HEALTH RISK ASSESSMENT.

THEY'RE NOT GOING TO TELL YOU NUMBERS THAT THERE IS -- YOU KNOW, WE COME UP WITH THESE INCREMENTAL CANCER RISKS, YOU KNOW, WHAT'S THE CHANCES OF ACQUIRING CANCER. THEY DON'T DO THAT PART OF IT; THEY LOOK AT MORE OF A TREND-TYPE THING. THAT'S THE MAIN DIFFERENCE. SO, THAT'S THEIR MISSION, AND I BELIEVE THEY'RE PROBABLY LOOKING AT THAT ASPECT.

WITH RESPECT TO ECOLOGICAL RISKS, I'LL LET TOM BIXIE TALK ABOUT THIS AGAIN, HIS SPECIALTY HERE.

MR. BIXIE: AGAIN, WHEN WE WENT THROUGH OUR ANALYSIS, WE DID FIND THAT PESTICIDES, AND THAT WAS NO SURPRISE, WAS THE MAIN PROBLEM OR THE MAIN CONTAMINANT BEFORE THE TIME CRITICAL REMOVAL ACTION.

NOW, THE DRAINAGE DITCH GOES TO OVERS CREEK, THAT'S WHERE THE DRAINAGE DITCH GOES. THAT'S PARALLEL TO THE SITE. BASED ON OUR SAMPLING, WE DIDN'T SEE CONTAMINANTS REALLY MIGRATING DOWN TO THERE. AGAIN, RAY WENT OVER THE PESTICIDES, WHAT THEY DO, THEY ADHERE TO THE SEDIMENTS OR PARTICLES; THEY DON'T TRANSFER DOWNSTREAM READILY.

AND SO, THE AREA OF CONCERN WAS LIMITED TO RIGHT NEXT TO

THE SITE AND ON-SITE. WE WENT THROUGH AND LOOKED AT CERTAIN SEDIMENT, COMPARED IT TO STANDARDS AND VALUES THAT WOULD EVALUATE THE HEALTH OF AQUATIC ORGANISMS EXPOSED, AND ALSO WE WENT THROUGH THE TERRESTRIAL SCENARIO I MENTIONED BEFORE, ASSUMING THAT A DEER OR RABBIT WAS ON-SITE EATING PLANTS AND BEING EXPOSED TO THAT.

MRS. WOOD: WHAT ABOUT THE BURROWERS, OUR EVER-PRESENT MOLES AND THINGS LIKE THAT?

MR. DIXIE: TYPICALLY WE LOOK AT BURROWING WILDLIFE WHEN THERE'S A VERY HIGH RISK OF VOLATILES IN THE SOIL.

MRS. WOOD: BUT THEY WOULD NOT BE AFFECTED BY PESTICIDES?

MR. BIXIE: THEY WOULD. IN FACT, THEY WOULD BE IN CONTACT WITH THEM THE SAME WAY A RABBIT WOULD AND THE SAME WAY A BIRD WOULD. THEIR EXPOSURE WOULD BE GREATER BECAUSE THEY WOULD BE BURROWING INTO THEM. BUT THE DATABASE AND THE LITERATURE, REALLY, I DON'T THINK HAS ADVANCED FAR ENOUGH TO ASSUME THAT IF A GROUND SQUIRREL OR A MOLE WAS IN CONTACT WITH THE SOIL, HOW MUCH OF IT IT ABSORBS. TYPICALLY, THE EXPOSURE IS EVALUATED BASED ON THEM EATING WORMS THAT EAT THE DIRT, THEN EATING DIRT JUST BY GOING THROUGH THE SYSTEM, EATING PLANTS AND THINGS LIKE THAT. SO, IT'S PRIMARILY THAT EXPOSURE.

MRS. WOOD: BUT THEY ARE IN THE MODEL?

MR. DIXIE: EXCUSE ME?

MRS. WOOD: I MEAN, THE MOLES, ARE THEY THE BURROWING ANIMAL THAT'S IN YOUR MODEL?

MR. DIXIE: NO, IN OUR MODEL, WE HAVE RABBITS, DEER AND BIRDS.

MRS. WOOD: I WOULD THINK IF THAT STUFF IS GOING DOWN IT SEEMS APPROPRIATE TO --

MR. DIXIE: WELL, IN THIS PARTICULAR AREA, BASED ON, YOU KNOW, HOW THE PAD WAS AND LOOKING AT THE TYPES OF HABITATS, WE FELT THOSE WERE THE CRITICAL WILDLIFE SPECIES.

MR. WATTRAS: PLUS YOU HAVE TO REMEMBER THIS IS AN AREA, IT'S NOT IN THE MIDDLE OF THE WOODS. IT'S A MOWED LAWN.

MRS. WOOD: RIGHT. YEAH.

MR. WATTRAS: I MEAN, THAT HAS TO BE CONSIDERED, TOO. SO, NOT TO SAY THERE COULDN'T BE A MOUSE OR A MOLE.

COLONEL WOOD: WE'VE GOT MOLES IN OUR LAWN AT HOME.

MR. WATTRAS: OH, I KNOW. I'M NOT SAYING IT'S NOT --

MRS. WOOD: I WAS THINKING OF A MOLE, TOO.

MR. WATTRAS: -- YOUR TYPICAL ENVIRONMENT. WE HAVE THEM, TOO. I KNOW WHAT YOU'RE SAYING.

MR. BIXIE: I GUESS, ON THE OTHER SIDE, TOO, IS WHENEVER WE PICK WILDLIFE THAT WE'RE GOING TO EXAMINE, IT'S TYPICALLY WILDLIFE THAT HAS A LARGE HISTORY OF BEING STUDIED. FOR INSTANCE, THERE'S BEEN A LOT OF HISTORY ON THE EFFECTS OF

CHEMICALS ON RABBITS, ON CHICKENS, ON DEER.

MRS. WOOD: SO, YOU HAVE YOUR --

MR. BIXIE: AND WE KNOW PRETTY MUCH HOW MUCH A RABBIT EATS, HOW MUCH WATER A RABBIT NEEDS, WHAT THE AREA THAT A RABBIT WOULD -- ITS HOME RANGE, BECAUSE THAT HAS TO BE TAKEN INTO CONSIDERATION. WHEN WE LOOK AT A DEER THAT HAS A VERY BIG HOME RANGE. SO, YOU ASSUME THAT THE ACTUAL FOOTPRINT THAT IS CONTAMINATED, MAYBE IT'S 100 FEET BY 100 FEET, MAY ONLY BE ONE PERCENT OF ITS HOME RANGE. THE OTHER 99 PERCENT OF ITS TIME, YOU ASSUME THAT IT'S IN DIFFERENT AREAS THAT ARE NOT CONTAMINATED. SO, THAT HAS TO BE FACTORED INTO THE MODEL.

THAT COMES INTO PLAY, FOR INSTANCE, WHEN WE -- WE DON'T TYPICALLY LOOK AT, LIKE, TURTLES OR SNAKES BECAUSE THERE'S NOT A LOT OF -- ALTHOUGH THEY ARE IMPORTANT, AS WILDLIFE, THERE'S NOT A LOT OF INFORMATION IN TERMS OF HOW MUCH WATER DOES A SNAKE DRINK.

MRS. WOOD: YEAH.

MR. DIXIE: SO, YOU REALLY HAVE TO BASE A LOT OF, WHEN YOU SELECT YOUR WILDLIFE, ON WHAT TYPE OF INFORMATION YOU HAVE ON HOW MUCH IT EATS. SO, THAT COMES INTO PLAY, TOO.

WHEN WE WENT THROUGH THIS MODEL AND BEFORE THE TIME CRITICAL ACTION, WE AGAIN DETERMINED IF PESTICIDES WOULD PRESENT A PROBLEM TO THESE WILDLIFE BEING EXPOSED, AND DO PRESENT A PROBLEM TO ANY TYPE OF AQUATIC ORGANISMS BEING EXPOSED IN THAT DITCH.

NOW, WE DID REALIZE THAT THE DITCH WAS A DRAINAGE DITCH

AND THERE WASN'T OBVIOUSLY A VIABLE POPULATION OF FISH. THERE MAY BE SOME FROGS, MAYBE A TADPOLE OR SOMETHING LIKE THAT, BUT TO BE CONSERVATIVE, WE TREATED IT AS A SERVICE WATER BODY AND COMPARED IT TO THOSE STANDARDS. I THINK THE NEXT SLIDE --

MR. WATTRAS: WELL, THIS ONE BASICALLY SAYS BEFORE -- IF YOU DIDN'T REMOVE THE SOIL, WE FOUND THAT THERE WOULD BE A DECREASE IN VIABILITY, WHICH IS PRETTY OBVIOUS WITH THOSE LEVEL OF PESTICIDES. THEN WE LOOKED AT IT FROM A STANDPOINT, OKAY, AFTER THE SOIL IS REMOVED, AND IT HAS BEEN REMOVED, TOM AND HIS GROUP LOOKED AT WHAT WOULD BE THE IMPACTS AFTER THAT.

MR. BIXIE: AND AFTER WE SAW THAT THERE -- BASED ON THE TERRESTRIAL RECEPTORS IN OUR MODEL, THERE WOULD BE NO DECREASE IN THE VIABILITY OF THE TERRESTRIAL RECEPTORS. THERE WOULD STILL BE A VERY SLIGHT DECREASE IN TERMS OF THE AQUATIC RECEPTORS, BUT WHAT WE SEE THIS IS, AND RAY MENTIONED THIS, IS TO THE LEVELS OF PESTICIDES THAT WE SEE THROUGHOUT THE BASE FROM A NORMAL SPRAYING. THE AREAS THAT HAVE VERY HIGH LEVELS THAT REALLY WOULD PRESENT A SIGNIFICANT RISK TO AQUATIC ORGANISMS IN THIS DRAINAGE DITCH, WERE BEING REMOVED BASED ON SOME OF THE REMOVAL ACTIONS. SO, WE FELT LIKE IT ADDRESSED THE SIGNIFICANT RISKS.

MRS. WOOD: WE'VE GOT A DECREASE. IT'S NOT NEUTRALIZED, BUT IT'S --

MR. BIXIE: AND THEN, THAT LOW LEVEL, AGAIN, WOULD EXIST THROUGHOUT ANY AREA, A GOLF COURSE, WOULD HAVE THOSE PESTICIDES, BUT IT WASN'T AT THAT HIGH LEVEL.

MR. WATTRAS: THE FEASIBILITY STUDY, BECAUSE NOW, AFTER REMOVING THE SOIL, AND WE DID AN EVALUATION OF THE RISKS AND WE DETERMINED THERE WAS NO MORE UNACCEPTABLE RISKS TO HUMAN HEALTH AND THE ENVIRONMENT, WE THEN LOOKED AT OUR ONLY PROBLEM REMAINING, WHICH HAPPENED TO BE THIS SMALL PLUME OF ETHYLBENZENE AND XYLENE IN GROUNDWATER.

WE LOOKED AT SIX ALTERNATIVES THAT WE COULD DO WITH THIS CONTAMINATION PROBLEM. ALTERNATIVE ONE BEING NO ACTION; ALTERNATIVE TWO BEING INSTITUTIONAL CONTROL WHERE WE WOULD JUST KEEP MONITORING THE PROBLEM. AGAIN, IN THIS CASE EVEN -- ALTHOUGH WE HAVE SOME SUPPLY WELLS WHICH ARE QUITE FAR FROM THE SITE, IT WOULD INCLUDE SAMPLING OF THOSE WELLS TO MAKE SURE NOTHING IS WRONG WITH THEM. IT WOULD INCLUDE, OBVIOUSLY, NOT LETTING ANYBODY PUT ANY WELLS ON THE SITE.

THE THIRD ALTERNATIVE WOULD BE TO EXTRACT THE GROUNDWATER WITH THE WELL, OR WELLS, TREAT IT ON-SITE, AND THEN DISCHARGE IT THROUGH A SANITARY SEWER LINE TO THE SEWAGE TREATMENT PLANT.

THE FOURTH ALTERNATIVE WOULD BE SIMPLY TO COLLECT IT, DISCHARGE IT TO THE SEWAGE TREATMENT PLANT WITHOUT TREATMENT. THE REASON THAT WAS SELECTED IS BECAUSE, NUMBER ONE, WE'RE TALKING ABOUT SOME PRETTY LOW LEVELS TO BEGIN WITH. LEVELS THAT, AS I MENTIONED BEFORE, ARE BELOW STATE STANDARDS FOR GROUNDWATER, BUT ARE JUST SLIGHTLY ABOVE -- I'M SORRY, THAT ARE BELOW THE FEDERAL STANDARDS FOR GROUNDWATER BUT ARE SLIGHTLY ABOVE STATE STANDARDS.

AND AT THOSE LEVELS, PUTTING IN A SANITARY SEWER LINE AND SENDING IT TO THE SEWAGE TREATMENT PLANT WOULD PROBABLY BE FEASIBLE FOR TREATING IT DOWN TO A FURTHER LEVEL.

MRS. WOOD: OKAY, NOW, THIS IS GOING TO BE ONE THAT A PIPE SWINGS IN? IT'S GOING TO THE FRENCH CREEK PLANT? OR ARE YOU --

MR. WATTRAS: WE WOULD SEND IT TO THE NEAREST SANITARY SEWER LINE. AND I KNOW YOU'RE TALKING ABOUT THE FUTURE TREATMENT PLANT.

MRS. WOOD: YEAH, THEY WERE TALKING ABOUT --

MR. WATTRAS: YEAH, IT WOULD GO TO, PROBABLY BY THE TIME, IT WOULD PROBABLY GO TO THAT TREATMENT PLANT.

MRS. WOOD: SO, I MEAN, THIS IS NOT GOING TO BE DONE INSTANTLY?

MR. WATTRAS: BUT THAT'S NOT GOING TO BE THE SELECTED ALTERNATIVE ANYWAY. BUT IT REALLY WOULDN'T MATTER -- HADNOT POINT, EVEN IF HADNOT POINT IS OPERATING, WHICH IT STILL IS, SENDING IT INTO A SANITARY SEWER LINE AND TAKING IT ALL THE WAY DOWN TO HADNOT POINT WOULD STILL BE ACCEPTABLE. THEY HAVE A BIOLOGICAL TRICKLING FILTER, AND THEY HAVE AN AERATION POND, THAT WOULD PROBABLY BE ABLE TO REMOVE THESE LEVELS OF ETHYLBENZENE AND XYLENE. WE'RE TALKING ABOUT SOME VERY LOW LEVELS.

COLONEL WOOD: BUT YOU'RE ALSO TALKING ABOUT PLANTS THAT ARE BEYOND THE -- USABILITY.

MRS. WOOD: THEY'RE UNDER WAIVER, LET'S PUT IT THAT WAY.

COLONEL WOOD: THEY'RE DISCHARGING LOTS OF WATER INTO THE RIVER THAT THEY SHOULD NOT BE. IN OTHER WORDS, THEY'RE OVER THE STATE STANDARDS.

MR. PAUL: THAT'S CORRECT.

MRS. WOOD: LET'S NOT GET OFF ON THAT.

MR. WATTRAS: YES, I KNOW WHAT YOU'RE TALKING ABOUT.

MR. PAUL: YEAH. YEAH, LET'S DON'T GET -- THE BOTTOM LINE HERE IS WE'RE NOT GOING TO -- IT'S NOT ECONOMICALLY FEASIBLE TO CHASE THESE TRACE AMOUNTS OF CONTAMINATION.

MR. WATTRAS: THE FIFTH ALTERNATIVE WOULD BE TO COLLECT IT AND DISCHARGE IT AND PIPE IT OUT TO SITE 82. NOW, SITE 82 IS LOCATED ABOUT TWO MILES DOWN THE ROAD, AND WE'RE BUILDING A TREATMENT PLANT TO DEAL WITH A MAJOR GROUNDWATER PROBLEM OUT THERE. AND WE SAID, WELL, LET'S JUST COLLECT IT AND SEND IT TO SITE 82.

AND THE SIXTH ALTERNATIVE WOULD INVOLVE IN SITU TREATMENT. AND IT'S PRETTY MUCH WHAT I TALKED ABOUT BEFORE WHERE WE WOULD TRY SOMETHING LIKE VAPOR EXTRACTION TO PULL OUT THESE VOLATILES.

THE COST OF THESE ALTERNATIVES GO FROM ZERO; THE MOST EXPENSIVE ALTERNATIVE WOULD BE TO BUILD AN ON-SITE TREATMENT

PLANT, WHICH IS PRETTY OBVIOUS BECAUSE OF THE CAPITAL COSTS, WE'RE LOOKING AT ALMOST TWO MILLION DOLLARS TO DO THAT.

TO JUST MONITOR IT AND TO SEE WHAT'S HAPPENING OVER TIME WOULD COST THE DEPARTMENT OF THE NAVY ABOUT $350,000. THAT'S MAINLY AN ANALYTICAL COST. WE'RE TALKING ABOUT USING ABOUT FIVE OR SIX MONITORING WELLS, TAKING SAMPLES QUARTERLY, MAYBE OVER TIME TAKING THEM BI-ANNUALLY, AND ANALYZING THEM FOR CONTAMINANTS OF CONCERN HERE.

MRS. WOOD: WELL, NOW, THAT 350,000 IS PROJECTED OVER WHAT PERIOD OF YEARS?

MR. WATTRAS: THAT'S PROJECTED OVER 30 YEARS.

MRS. WOOD: 30 YEARS, OKAY.

MR. WATTRAS: THAT'S A STANDARD TIME FRAME THAT WE LOOK AT THINGS --

MRS. WOOD: OKAY. RIGHT, I REMEMBER THAT CAME UP EARLIER.

MR. WATTRAS: -- WHEN WE DO COST ANALYSES, AND THESE ARE PRESENT WORTH COSTS.

MRS. WOOD: OKAY.

MR. WATTRAS: THAT WOULD BE THE MONEY YOU'D HAVE TO SET ASIDE TODAY AND DRAW FROM.

ALTERNATIVE NUMBER FOUR IS SENDING IT DOWN TO -- THROUGH A SANITARY SEWER LINE DOWN TO HADNOT POINT WOULD BE ABOUT 1.3 MILLION. ALTERNATIVE FIVE -- THAT'S STILL BACKWARDS. I'M SORRY.

MRS. WOOD: YEAH, IT'S GOING TO 82.

MR. WATTRAS: OH, ALTERNATIVE FIVE IS TO COLLECT IT AND SEND IT DOWN TO SITE 82. THAT ONE IS ABOUT 1.4 MILLION. AND ALTERNATIVE SIX IS TO DO THE IN SITU STUDY, OR THE IN SITU REMEDIATION; THAT WOULD BE ABOUT 1.3 MILLION. NOW --

MR. PAUL: EXCUSE ME, RAY, IS THERE A MINIMUM AMOUNT OF ALTERNATIVES YOU HAVE TO COME UP WITH? I DON'T KNOW IF YOU PROBABLY KNOW THIS ANSWER, BUT I KNOW YOU HAVE TO USE ALTERNATIVES IN YOUR FEASIBILITY STUDIES.

MR. WATTRAS: I MISSED YOUR QUESTION. I COULDN'T HEAR YOU.

MR. PAUL: IS THERE A MINIMUM --

MR. WATTRAS: AMOUNT OF ALTERNATIVES?

MR. PAUL: RIGHT. I KNOW YOU HAVE TO USE NOTHING AS ONE.

MR. WATTRAS: YOU ALWAYS HAVE TO USE NO ACTION. YOU ALWAYS SHOULD CONSIDER A TREATMENT, TOTAL TREATMENT ALTERNATIVE.

MR. PAUL: RIGHT.

MR. WATTRAS: YOU SHOULD ALWAYS CONSIDER A CONTAINMENT ALTERNATIVE. I BELIEVE THOSE ARE AT LEAST THREE ALTERNATIVES THAT YOU ALWAYS HAVE TO CONSIDER. CONTAINMENT, TOTAL REMEDIATION AND NO ACTION. AND INNOVATIVE -- WELL, TREATMENT IS PREFERRED.

MS. TOWNSEND: YOU START LOOKING AT -- AT --

OF THOSE THREE OPTIONS, THEN YOU LOOK AT LANDFILL ON-SITE, LANDFILL OFF-SITE. YOU GET INTO THOSE BREAK-UPS WHERE IT'S REALLY THREE CATEGORIES.

MR. PAUL: I KNOW YOU GUYS ALWAYS DO A REAL GOOD JOB OF PROPOSING QUITE A FEW ALTERNATIVES FOR US.

MR. WATTRAS: YEAH, THERE ARE CERTAIN ONES THAT YOU ALWAYS HAVE TO CONSIDER, UNLESS THERE'S A SITUATION WHERE YOU FIND OUT THAT YOU SAMPLE A SITE AND SOMETIMES YOU MIGHT -- YOU DON'T EVEN NEED A FEASIBILITY STUDY IF YOU DETERMINE THAT, AFTER SAMPLING, YOU DON'T HAVE A PROBLEM, THEN IT DOESN'T MAKE SENSE TO DO A FEASIBILITY STUDY, BUT THAT'S KIND OF RARE.

AS I MENTIONED BEFORE, SOIL -- WE'RE NOT GOING TO DO ANYTHING MORE TO THE SOIL. WE'RE DEALING WITH IT NOW, AND WHAT'S REMAINING IS ACCEPTABLE. IT'S NOT AT HIGH LEVELS THAT'S GOING TO CAUSE A PROBLEM.

GROUNDWATER, THE PROPOSED ALTERNATIVE HERE IS TO NOT TREAT IT, BUT TO JUST PERFORM INSTITUTIONAL CONTROLS, AND I'LL EXPLAIN A LITTLE BIT ABOUT THIS APPROACH.

THE INSTITUTIONAL CONTROLS WOULD INCLUDE AN ORDINANCE RESTRICTION FOR PUTTING ANY SUPPLY WELLS IN THIS AREA. IT WOULD INVOLVE LONG TERM GROUNDWATER MONITORING OF THE SHALLOW AND OF THE DEEP AND OF A FEW OF THE SUPPLY WELLS.

COLONEL WOOD: WHAT IS LONG TERM?

MRS. WOOD: 30 YEARS.

MR. WATTRAS: IT WOULD BE 30 YEARS, BUT I'LL

QUALIFY THAT. EVERY FIVE YEARS -- WHEN YOU SELECT AN ALTERNATIVE THAT IS NOT A FINAL REMEDY, IN OTHER WORDS, A CONTAINMENT ALTERNATIVE, FOR EXAMPLE, OUT AT HADNOT POINT WHERE WE'RE CONTAINING THAT PLUME, THAT'S NOT A FINAL REMEDY. EVERY FIVE YEARS, UNDER CERCLA, IT'S A REQUIREMENT THAT YOU LOOK AT THE PROBLEM AGAIN TO SEE IF THE ALTERNATIVE IS, NUMBER ONE, EFFECTIVE; WHETHER IT'S EFFECTIVE FROM THE STANDPOINT THAT YOU ARE REDUCING CONTAMINATION OR YOU'RE PREVENTING MIGRATION; OR IN SOME CASES, YOU KNOW, I GUESS IT'S POSSIBLE THAT THINGS COULD GET WORSE IN FIVE YEARS, THAT THE ALTERNATIVE THAT YOU SELECTED WASN'T THE BEST ALTERNATIVE. BUT WHEN I SAY 30 YEARS, SAY IN FIVE OR TEN YEARS, AND YOU HAVE TO DO THIS EVERY FIVE YEARS, IN TEN YEARS, WE MONITOR THIS PROBLEM AND WE SEE THAT, OVER TIME, THESE ETHYLBENZENE AND THE XYLENE HAS DECREASED IN CONCENTRATION TO THE POINT THAT THEY'RE NOT A PROBLEM ANYMORE, IT WOULD BE DONE. SO, THEORETICALLY 30 YEARS. POSSIBLY AS LITTLE AS FIVE YEARS, SOMEWHERE IN BETWEEN THERE.

MRS. WOODS: SO, WHEN THEY GET DOWN TO BELOW STATE REQUIREMENTS --

MR. WATTRAS: BELOW STATE STANDARDS.

MRS. WOODS: -- THAT'S IT.

MR. WATTRAS: THE REASON WE SELECTED THIS ALTERNATIVE AS OPPOSED TO TREATMENT IS, NUMBER ONE, THERE IS NO RISK. WE'RE TALKING ABOUT A VERY SMALL POCKET OF GROUNDWATER. WE'VE DISCUSSED BEFORE ABOUT THE FACT THAT THERE IS NO EXPOSURE

BECAUSE EVERYBODY'S GETTING THEIR WATER FROM THE SUPPLY WELL.

THE OTHER ASPECT HAS TO DO WITH THE CONTAMINANTS THEMSELVES, XYLENES AND ETHYLBENZENES, THEY'RE RELATED TO PETROLEUM PRODUCTS. OVER TIME, I MENTIONED THAT SAMPLES WERE FIRST BEING TAKEN IN THE MID-80S, CONCENTRATIONS HAVE BEEN DECREASING. WE HAVE A HANDLE ON THE LIMITED AREA OF CONTAMINATION. THESE ARE CONTAMINANTS THAT CAN, THROUGH NATURAL PROCESSES, BIODEGRADE IN THE AQUIFER. THEY ARE SEEING THAT AT A LOT OF SITES NOW WITH PETROLEUM. IF I'M NOT MISTAKEN, THE STATE -- - MAYBE, PATRICK, I DON'T KNOW IF YOU CAN ADD ANYTHING TO THIS, THE STATE OF NORTH CAROLINA IS LOOKING AT A LOT OF PETROLEUM GROUNDWATER PROBLEMS WHERE THEY'RE LOOKING AT POSSIBLY JUST MONITORING THAT PROBLEM. IF IT'S A LOW LEVEL PROBLEM. I MEAN, OBVIOUSLY, WE'RE NOT TALKING ABOUT A MAJOR PROBLEM HERE WHERE THE STATE WOULD JUST SAY, "OH, LET'S JUST MONITOR IT."

BUT IN A SITUATION LIKE THIS WHERE YOU'RE JUST AT THE LEVELS, WE'RE LOOKING AT IT FROM THE STANDPOINT IT BECOMES REALLY NOT A FEASIBLE IDEA TO GO AHEAD IN THERE, INVEST ALL THAT CAPITAL TO START TREATING WHEN IT'S COST-EFFECTIVE TO JUST MONITOR THIS PROBLEM, WE THEN -- THEORETICALLY, WE'VE BEEN MONITORING IT SINCE THE MID-80S AND HAVE FOUND THAT THE LEVELS HAVE BEEN SLOWLY DECREASING, AND, DUE TO THE NATURE OF THESE CONTAMINANTS, WE BELIEVE, JUST THROUGH NATURAL ATTENUATION, THAT IT WILL CLEAN ITSELF UP THROUGH TIME.

MRS. WOOD: AND IT'S AN AREA WHERE YOU'VE

GOT TIME.

COLONEL WOOD: DO YOU HAVE AN APPROXIMATE DATE TO EXPECT IT MAY BE CLEAN?

MR. WATTRAS: NO, WE DO NOT. WE DON'T HAVE AN APPROXIMATE DATE. WE WILL BE MONITORING THIS, LIKE I SAID, OVER TIME, AND IN FIVE YEARS, WE'LL DO A PRETTY GO ANALYSIS OF WHAT HAS CHANGED WITHIN THE LAST FIVE YEARS.

THERE ARE MODELS, COMPUTER MODELS, THAT WE COULD THEORETICALLY COME UP WITH A DATE, BUT YOU KNOW WHAT, THAT'S A THEORETICAL MODEL, SO NOTHING'S GUARANTEED. MODELING IS VERY -- THERE'S A LOT OF GOOD ASPECTS ABOUT USING COMPUTER MODELS. YOU COULD USE IT IN THIS CASE, AND IT WILL POP OUT A NUMBER, BUT IT'S JUST GOING TO BE A BEST GUESS OF A NUMBER OF YEARS.

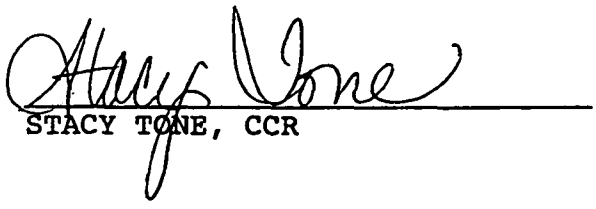
BUT AT THESE LEVELS, I WOULD BE, YOU KNOW, KIND OF SURPRISED IF A MODEL CAME OUT AND SAID IT'S GOING TO TAKE A HUNDRED YEARS, YOU KNOW. I THINK AT THESE LEVELS, BY JUST LEAVING THE PROBLEM GO AND SEEING THE DECREASE OVER TIME, THAT WE HAVE SEEN, THAT WE WOULD BE IN PRETTY GOOD SHAPE.

THAT CONCLUDES THIS OPERABLE UNIT, AND DO YOU HAVE ANY QUESTIONS?

MRS. WOOD: NO, I JUST ENJOYED THIS VERY MUCH. WE APPRECIATE THIS.

(WHEREUPON, THESE PROCEEDINGS CONCLUDED AT 8:58 P.M.)

I CERTIFY THAT THE FOREGOING IS A CORRECT TRANSCRIPT FROM THE RECORD OF PROCEEDINGS IN THE ABOVE-ENTITLED MATTER.



STACY TONE, CCR

8-9-94
DATE